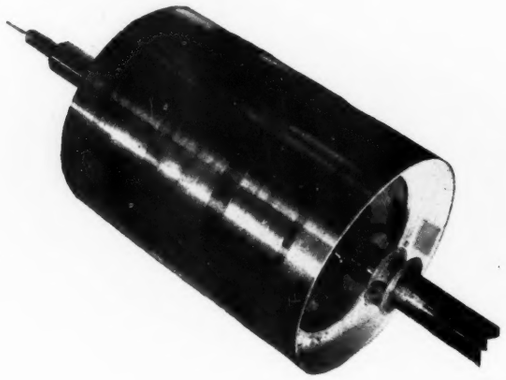
Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Chicago, November 28, 1925 (Issued Every Other Week) Volume XXVIII, No. 24

MEMBER A.B.C. *The Only Paid Circulation in this Industry* MEMBER A.B.P.

Printing of This Issue Is 5000 Copies. Next Issue Will Be December 12



With the Low Cost . . . . . of Dings Magnetic Separation . can you afford . . . . . to risk crusher breakdown, . . Plant shutdown . . . . . to TRAMP IRON? . . . . . .

Dings Separator at Iron Cap Copper Company's plant.

Dings *High Intensity* **MAGNETIC SEPARATION**

Birmingham
513 N. 21st St.

Buffalo
988 Ellicott Square

Chicago
115 S. Dearborn St.

Cincinnati
Mercantile Library Bldg.

Cleveland
Leader-News Bldg.

Denver
1718 California St.

Detroit
805 Hammond Bldg.

Los Angeles
San Fernando Bldg.

New York
52 Vanderbilt Ave.

Pittsburgh
1522 Oliver Bldg.

Salt Lake City
201 Dooly Block

San Francisco
419 Call Bldg.

St. Louis
410 Granite Bldg.

Kansas City
725 Livestock Exch. Bldg.

Dings Magnetic Separator Co.
803 Smith St., Milwaukee, Wis.

Rock Products
CEMENT and ENGINEERING NEWS

Volume XXVIII | Chicago, November 28, 1925 | Number 24

Trinity Portland Cement Company's New Plant at Fort Worth

A Compact and Simple Layout Provides Easy Operation with Ample Opportunity for Expansion

ONE of the things that differentiates the new plant of the Trinity Portland Cement Co., at Fort Worth, Texas, is its compactness. It is almost literally true, as Mr. Chaney, the superintendent, expressed it, that "a man in the quarry can talk to a man in the packing plant." And yet this compactness has not been attained by sacrificing essential space nor failing to provide for expansion. As the plant stands, foundations are in place for another kiln and for additional raw and finish grind mills. This would double the ouput. It has been so planned that two more kilns could be placed on the other side of the craneway, space has been left in

Fort Worth plant of the Trinity Portland Cement Co. as it appears when approached from the city. The quarry is on the other side.

The quarry face is 30 ft. high. Limestone is dug at the near end and shale at the far end

of the cement made, and owing to the inclination of the ground and a slight pitch of the limestone toward the plant, the lime runs out about two-thirds of the way down the face and the shale comes to the surface. This gives an opportunity to quarry any mixture of rock from straight limestone to straight shale.

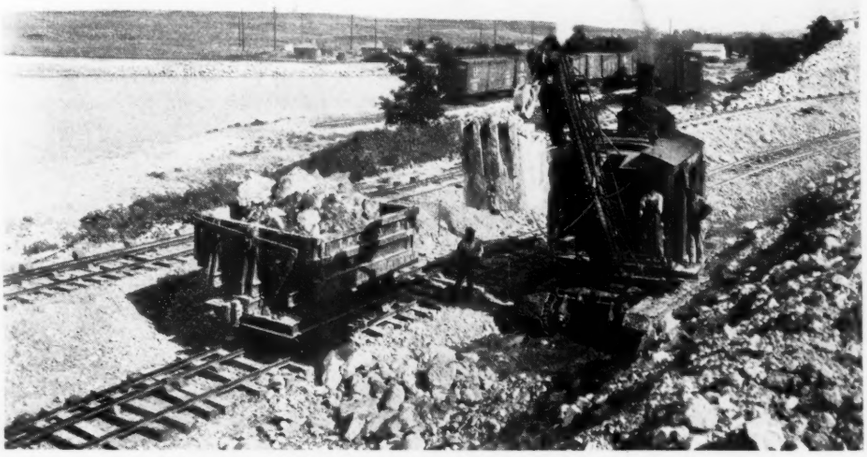
The limestone is highly fossiliferous, so much so that in places there are strata containing only fossils. Those that were noted were cephalopods, nautilids and amonites, giant snail shells, some of them almost 2 ft. in diameter. Near Houston and near San Francisco, cement is being made from shell beds found on the ocean bottom near the shore. It is evident that this deposit at Fort Worth is in part just such a shell bed which was laid down at a much earlier time.

The shale is soft; it can be easily cut with a knife. The upper stratum, from which cement is made, shows only traces of petroleum but at one of the low points in the quarry a rich looking oil shale is exposed.

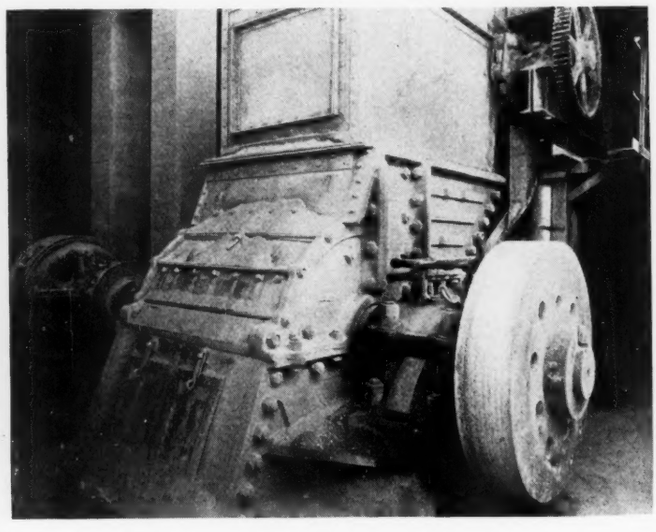
the grinding plant for additional mills, and the packing plant has been built to serve a larger output. It would thus be possible to bring the plant to four times its present production by merely making additions of the needed machinery, without making any radical changes in the buildings or the plant layout.

This compactness has resulted in a low labor cost, for it makes it possible for one man to do what requires two or more in some other plants. Perhaps the best example of this is to be found in the grinding department. Raw grind and finish grind mills are under one roof and one man looks after both of them. Eight men do all the work in the actual making of cement on the day shift and only six men on the night shift.

The quarry begins at the end of the plant and the face extends straight away from it. That part of the face nearest the plant is limestone, which is about 30 ft. thick. It lies over the shale, which is the other component

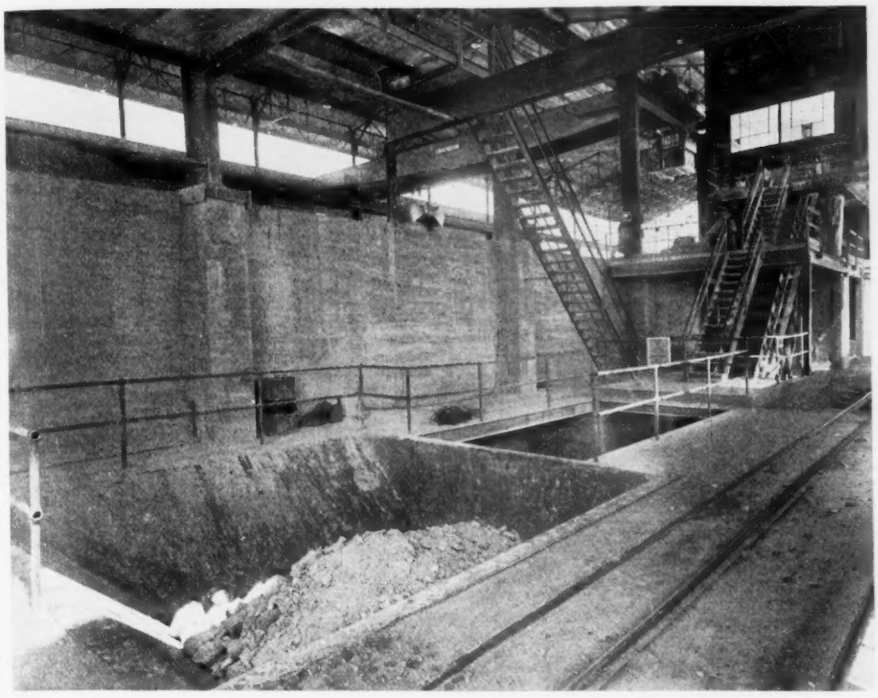


Loading limestone. Note the third rail for electric haulage.



Left—Dumping quarry cars to crusher. Right—The hammer mill, which is the only crusher employed

This has no present commercial value, but in view of all that is being said of the future relation of oil shale to cement making it gives rise to some interesting speculation.



Where the cars are dumped to the crusher. The pan conveyor, which lifts the rock to storage and the 16-ton crane show at the right

The quarry is worked in the usual way by putting down well-drill holes, for which a 6-in. Sanderson-Cyclone drill is used. Holes are set 10x10 ft. and staggered. The top of the deposit is loose and the bottom more compact, so all the powder charge is placed in the bottom of the hole. Atlas 40% powder is used.

The broken rock is loaded into cars by a No. 32 Marion steam shovel on crawler treads. This has a 1-yd. dipper.

Transportation from the quarry to the plant is by the Woodford haulage system. This is a system which is controlled by an operator in a controlling tower which in this case is at the plant, above where the cars are dumped into the receiving hopper. It employs a third rail with a 250-v. direct current. This particular installation is simple as everything is in full view of the tower operator from the time the cars leave the plant hopper until they return to it. The operator also dumps the cars through the ingenious device which belongs to this system and which is shown in one of the pictures. The car is caught by two hooks which are attached to a frame and yoke. Two chains from this yoke go to cam-quadrants on which the chains wind as the quadrants revolve. The weight of the yoke and hooks is balanced by counterweights fastened to wire ropes which are wound on sheaves on the same shaft as the quadrants. When this shaft is turned by a motor (through gearing) the hooks are lifted, dumping the car sidewise, not only quickly but smoothly, and the car body is set back on the bolsters with very little jar. To some extent the cars are also employed in switching railroad cars, which is a use to which the writer has not seen it put before.

There are three cars in use, each of 15-ton capacity. As in everything else about this plant, arrangements are ready for quickly increasing the transportation facilities. All that is necessary is to buy cars sufficient to handle the tonnage, the remainder of the equipment being adequate.

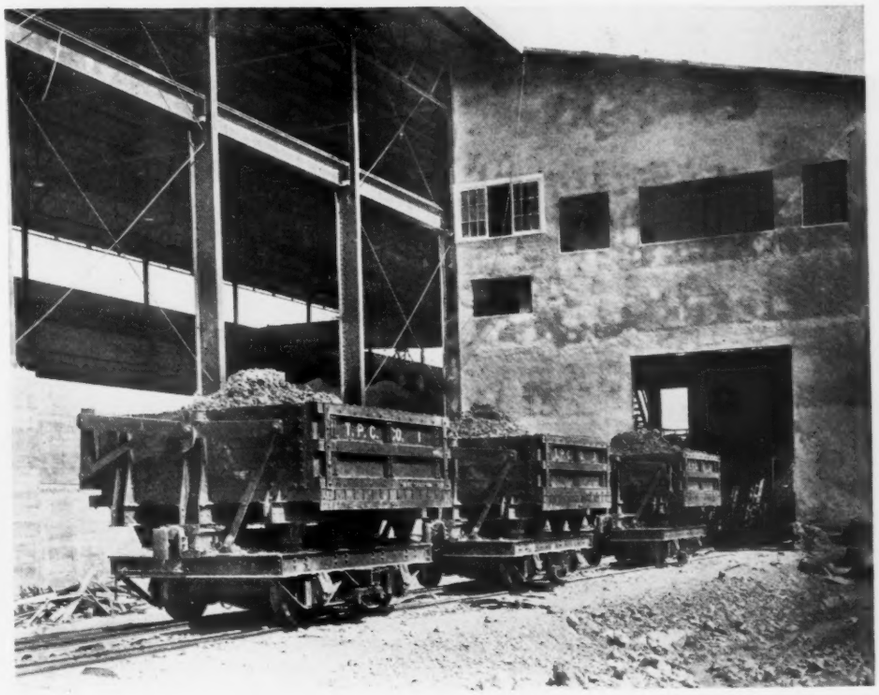
The track goes out from the plant to a switch and the two branches from this switch join to form a long loop. One side of this loop is parallel to the face and is kept near it to serve as a loading track. The other is away from the face and is called the passing track. The usual way of working is to send the empty cars out over the passing track and around the loop, spotting a car at the shovel as soon as the car before it has been loaded and sent to the plant.

This system of haulage is very much liked at this plant, and it certainly reduces quarry labor to a minimum. Except for the men on the well drill, the two men on the shovel are all that are employed in the quarry, the operator of the haulage system doing all the rest of the work.

The cars are dumped into a steel lined hopper 18x20 ft. and flow from this to a Williams hammer mill of the Mammoth (No. 7) type. This is the only crusher employed in the plant and it takes everything both limestone and shale from the largest rock that the shovel can load to the smallest piece. The crusher is set under the floor but it is in a large and well lighted concrete-lined room.

The crusher is driven by a 250-h.p. General Electric motor which makes 705 r.p.m. and the connection between motor and crusher is through a flexible coupling. An interesting point about this is that rope has been substituted for the regular leather belt used with this type of coupling and it has been found to give a considerably longer service.

The feeder to the Williams mill is of the pan type and it is driven by a 5-h.p. motor.



Type of car used with haulage system. The operator is in the building at right of picture

The discharge from the Williams mill is taken by a 42-in. Link-Belt pan conveyor and elevated to the bin under the craneway. A short cross conveyor takes it to the bin but the distribution to the various parts of the bin is by the crane. This is a Shepard 16-ton traveling crane with a 4-yd. clamshell bucket running above the bin on a very substantial steel construction. The span is 75 ft. and the lengthwise travel is 360 ft.

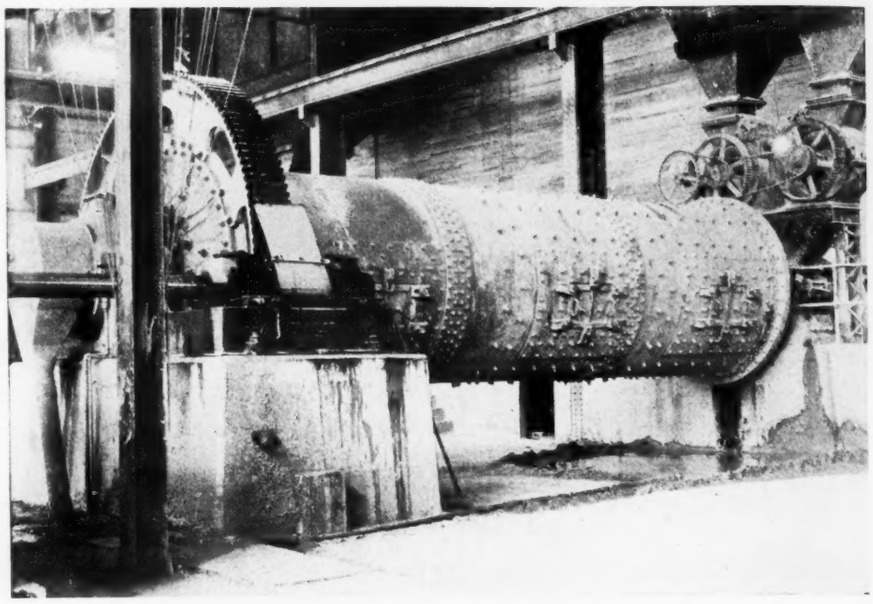
This crane, as in many modern cement mills, is the very heart of the plant, since it handles both raw material and clinker. The bin below it is divided into compartments which contain (beginning at the quarry end) shale, limestone clinker and gypsum rock. About 10,000 tons of rock are stored. As has been already noted, the quarry is arranged so that any desired mixtures of stone may be quarried. This mixture can be further varied by the addition of high or low calcium stone or shale from the crane bin, all of which makes for uniformity and for less correction after the raw material has been ground into slurry.

The grinding department contains two 7x26-ft. Traylor combination mills, one of which is used, wet, for the raw grind the other, dry, for the finish grind. These mills have each three compartments so that the reduction is in three stages. The first compartment contains steel balls which weigh 7½ lb. each when they are new. The second contains 2½-lb. steel balls and the third slugs of chilled white iron which are made at a local foundry. They have been found the most satisfactory grinding medium for giving the requisite fineness to the material. The raw grinding is carried to a point where at least 96% passes 100 mesh.

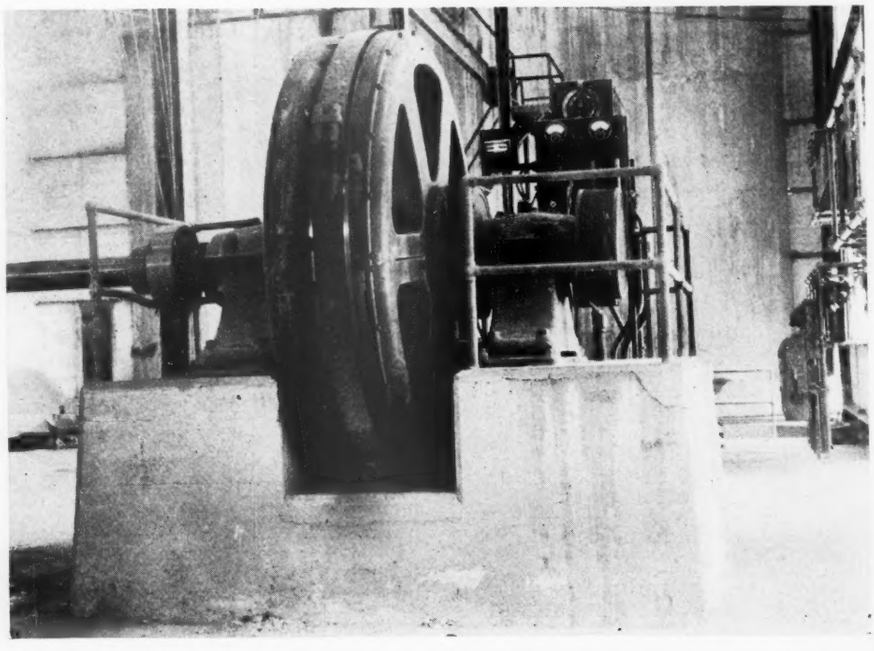
The feeder used with this mill was designed by O. V. Bartholomew, who has been in charge of operation at the Dallas plant of this company for a number of years. It is an application of the roll feeder which is so satisfactory a device when it is used as a primary feeder from bins. There are two rolls in this case, each working at the bottom of a chute, and as the rolls revolve they drag out material from the chute. The amount is regulated by sliding gates in the chute above the rolls. The rolls are driven by chains and gearing from an independent motor.

The same type of feeder is used on the finish grind mill, one roll being for feeding clinker, the other for feeding gypsum. On the raw grind mill one roll is used for limestone and one for shale, or each may be used on a different grade of limestone and shale mixture.

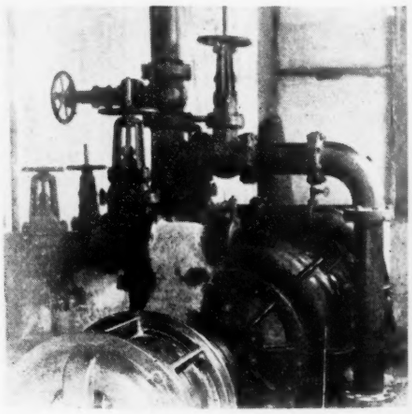
Each mill, raw grind and finish grind, is driven by a 500-h.p. General Electric motor of the super-synchronous type (Type AP-1). This is the type of motor in which both field and armature revolve during the starting period. The effect is to give a slow speed and powerful torque to start the mill, and as the speed of the mill increases the differential motion slows down until only the rotor moves. This obivates the use of a clutch and uses the current in such a way that no more power is needed at the start than when the mill is running up to speed. The motor is started by a lever which works on a quadrant, the position of the lever being advanced as the speed of the mill increases.



The three-compartment combination mill and Bartholomew feeder. Raw and finish grind mills are of the same type

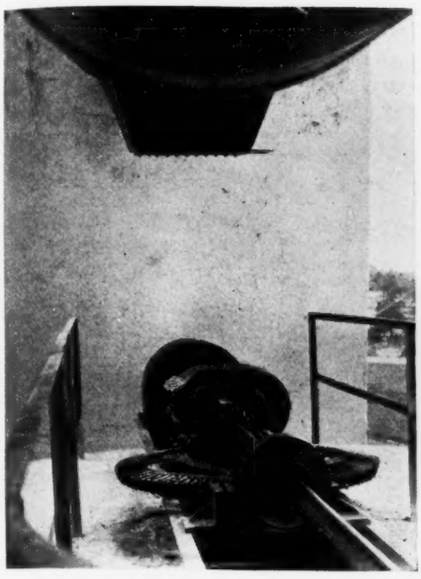


One of the two supersynchronous motors that drive the raw and finish grind mills

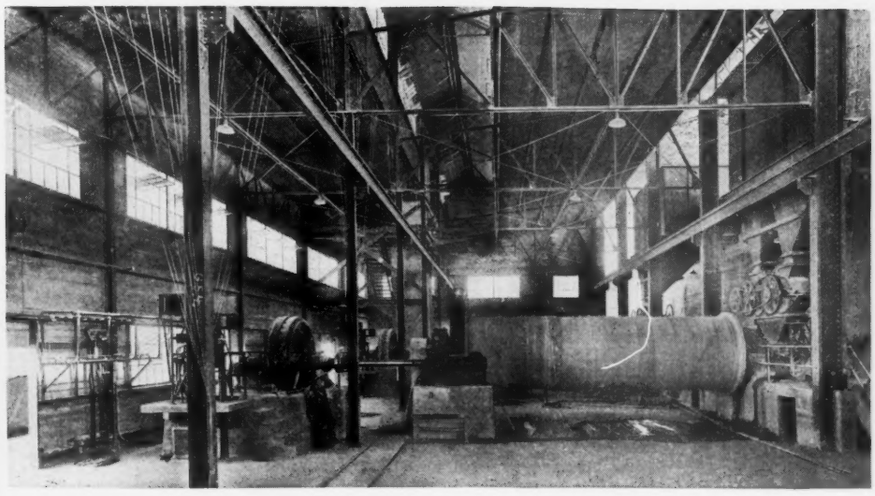


Transfer pumps for handling slurry

The slurry from the raw-grind mill runs by gravity to two 6-in. Morris pumps with managanese steel linings (No. 3), by which it is pumped to the batch tanks. These are driven by two 30-h.p. General Electric mo-



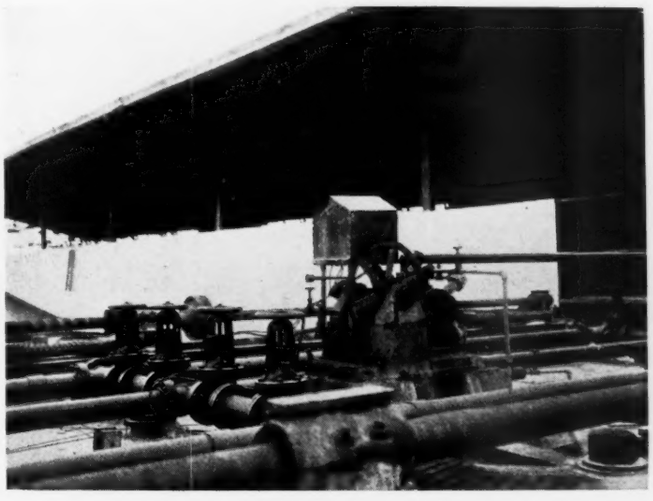
Agitating gear on kiln feed tank. Bottom of kiln shows above

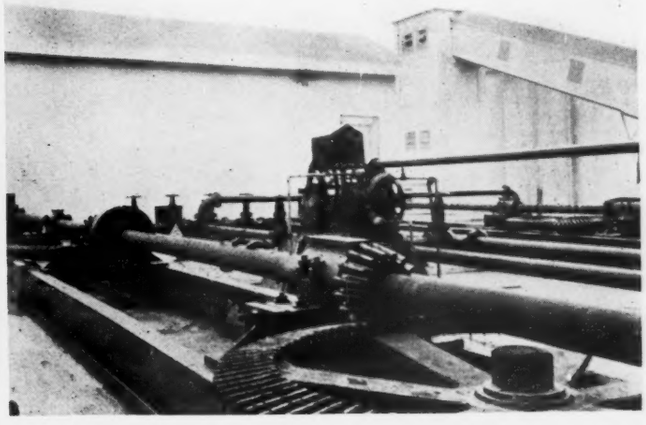


The grinding room, which has ample space for additional mills

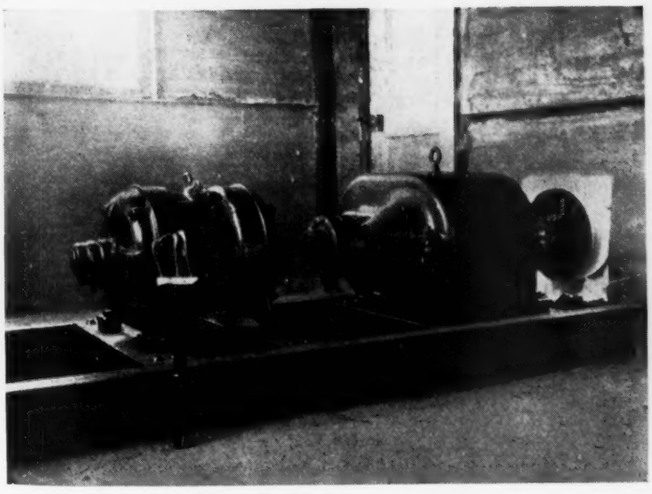
tors. A set of No. 5 Worthington pumps of the same size is used for transferring the slurry to the correction tank underneath the kiln from the batch tanks.

There are six batch tanks, each 16 ft. in diameter and 38 ft. high. The contents of

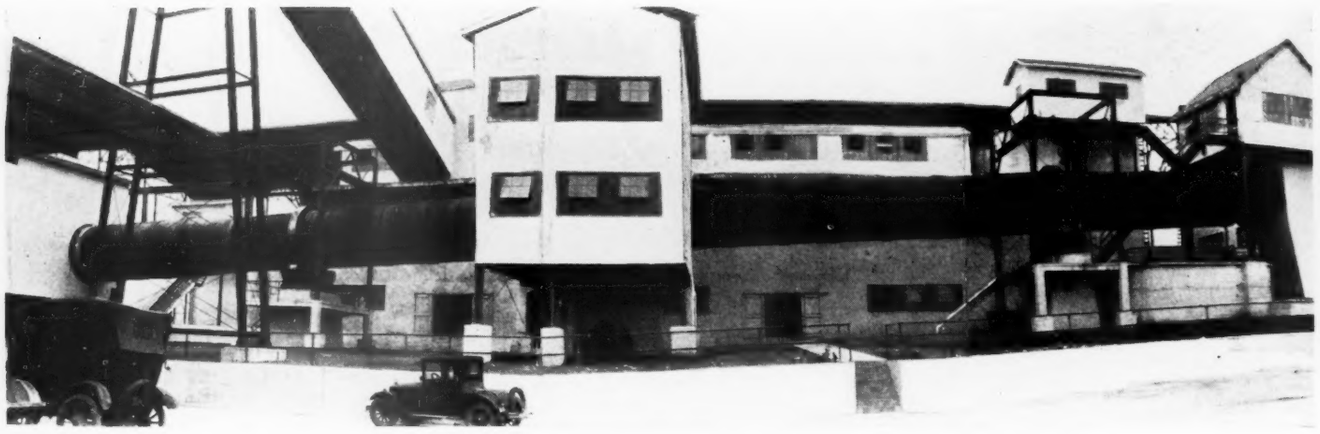




Left—The device for "shooting" each agitator in turn with compressed air. Right—Gearing for agitators



Left—One of the drives for agitator gearing. Right—Disk feeder for feeding kiln and its drive



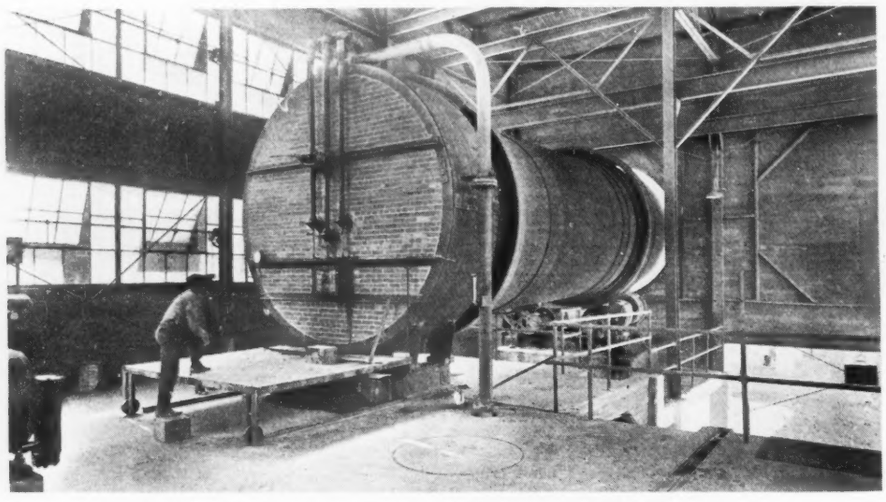
Panoramic view of the 250-ft. kiln. The drive is in the house near the center

these tanks is kept in agitation by both air and mechanical devices. The air agitation consists in giving each tank a "shot" of compressed air every 45 seconds, and the air is turned on and off (from one tank to another) by a very neat little motor driven device which is another of Mr. Bartholomew's inventions. The mechanical agitators were made by the Bethlehem Foundry and Machine Co. Each consists of a central shaft from which blades extend, and the blades are set at an angle so as to give an upward motion to the slurry as they pass through it. The shafts are driven by gear and pinion and the power comes from two Westinghouse 15-h.p. motors with Palmer-Bee speed reducers which have a ratio of 58 to 1. Each motor and speed reducer drives the agitators of three tanks.

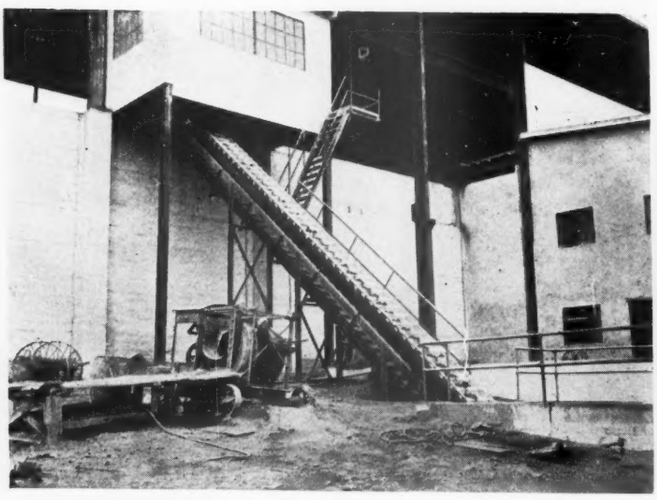
Each batch tank has its own float indicator, and all the indicators are placed side by side so that the depth of slurry in each tank may be seen at a glance, and it may also be seen how much slurry is being pumped from each tank when a transfer is being made.

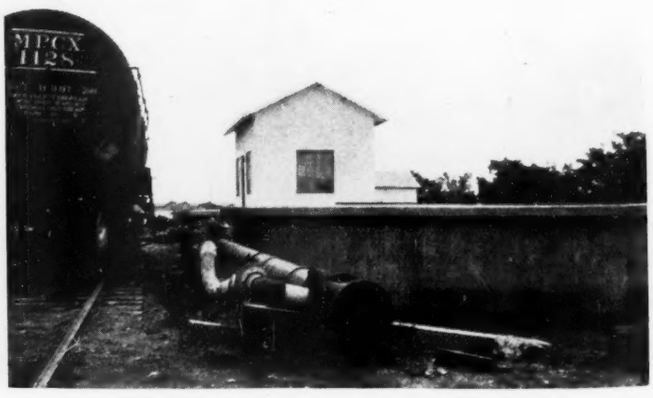
The correction tank, which also serves as a kiln feed tank, is placed under the feed end of the kiln. This tank is 20x20 ft. with semi-circular ends and it has two agitators of the same type as those used in the batch tanks. The shaft which drives these is also driven through a Palmer-Bee speed reducer.

The feeder to the kilns is an ingenious device invented by Mr. Bartholomew, a variation of the dipper feeder. It consists of a disk on the edge of which 12-in. elevator buckets are bolted. These dip into a box which is kept full by a pump, an overflow taking the excess to the correction tank. The level does not matter as in some other forms of dipper feeders as the buckets come up full all the time. Regulation of the feed



The firing rooms, showing the kiln hood with oil and air pipes





Left—The hot clinker falls into a well and is cooled by sprays and then dragged to the pan conveyor shown, which lifts it to storage. Right—Oil storage and oil pump house

is in two ways. A bucket or more may be taken off and the speed of the disc may be varied, the drive being from a 5-h.p. General Electric motor with a Foote Bros. speed reducer.

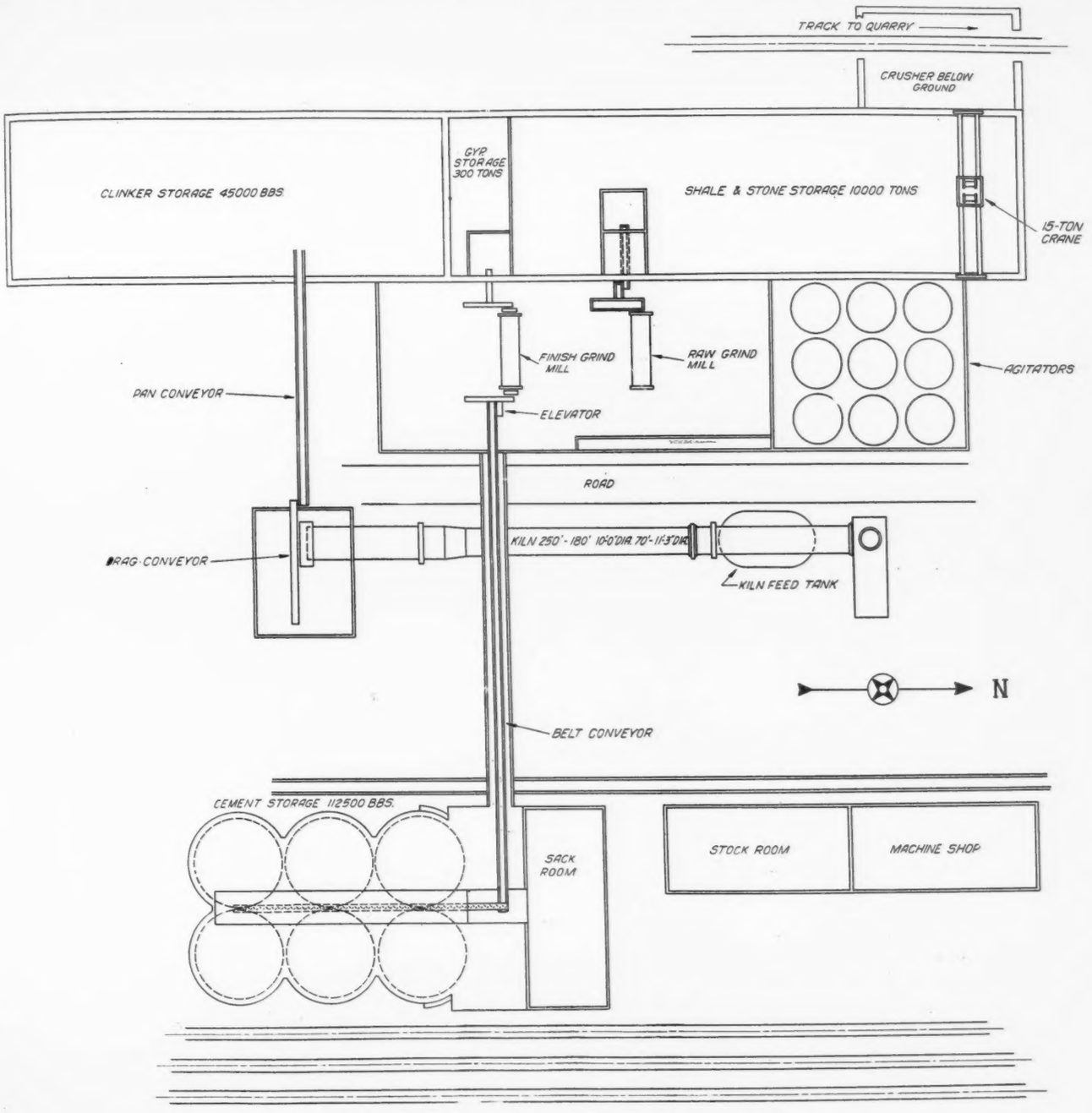
The plant has but one kiln, which is 250 ft. long. It is 11 ft. 3 in. in diameter for 70 ft. (the burning zone) and 10 ft. in diameter for the remaining 180 ft. It was made by Reeves Bros., Alliance, Ohio. When this kiln was installed it was said to be the largest in the world, but this statement was not entirely correct as there are 240 ft. kilns of greater diameter which makes them of greater cubical contents. It is believed that the length is as great as any that has been built.

The kiln is driven by a 125-h.p. variable speed motor which, however, has a normal speed of 875 r.p.m. under full load. The reduction is through gearing all the way, a pinion on the motor shaft driving a gear which is on the shaft of a worm and the worm driving through two spur gear reductions to the kiln. All the gears, except the pinion on the motor shaft and the gear which it engages, run in oil and are covered in.

A spare motor is kept at hand and in case of accident to the motor in service the change can be made without any delay. Such a change has already been made with a loss of less than 10 minutes from stop to start.

The kiln is not covered in but it is expected to be covered in eventually.

Oil is used as fuel and it is burned by a system which uses low pressure air. This is furnished by a General Electric blower and direct connected motor. The speed is 3520 r.p.m. and the air pressure is 3 lb. This is shown by a mercury tube manometer near the burner. Oil is pumped to the burner under a normal pressure of 200 lb. and a gage at the burner shows this to the man in charge.



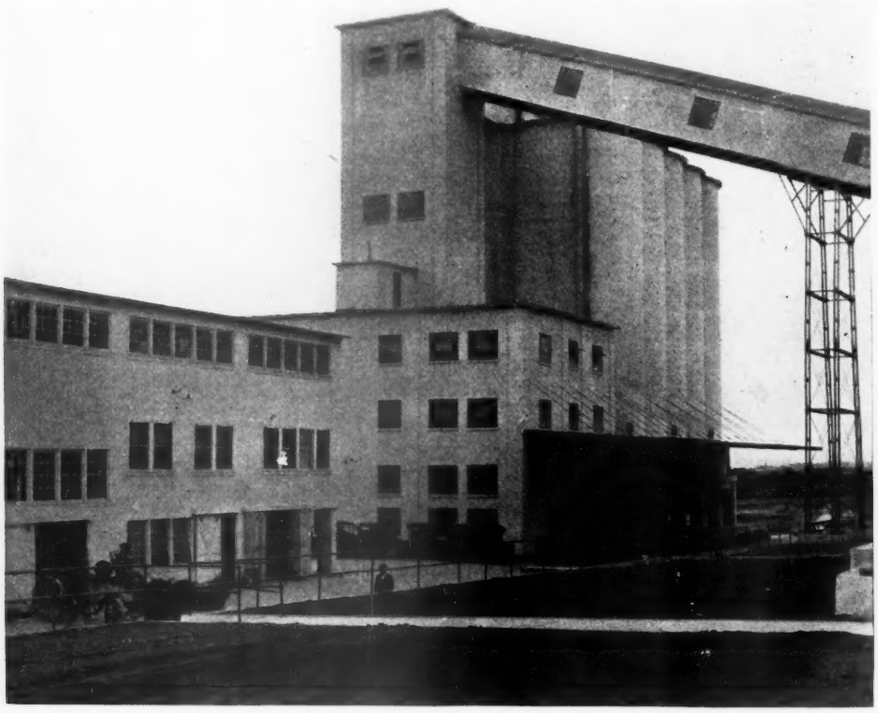
Plan showing the position of the various plant units

Variations in heat may be made by varying the oil pressure.

The clinker is cooled and transferred to storage by a system which is one of the unique features of the plant. The red hot clinker is sprayed with water and pulled out of a well tunnel below the kiln by a drag conveyor. It falls from this into a steel pan con-

veyor of the Pacific Coast type and is slowly elevated on a 45-deg. incline to the top of the clinker bin under the crane. The crane spreads it over the bin and also recovers it and puts it in the hopper of the finish grind mill.

The finish grind mill is exactly like the raw grind Traylor mill already described and it is 20 in. wide and 200 ft. between pulley centers. It runs in an inclined gallery (about 18 deg.) to the top of the packing plant. Here it delivers cement either to bins above the stationary packers or to the silos from which the cement is packed by portable packers. These silos are 85 ft. high and 33 ft. in diameter and will hold 116,000 bbl. of cement. They are filled by a cross (screw) conveyor which takes its load from the inclined conveyor.



Silos and packing plant. The building at the left contains offices and machine shop

The packing house is one of the features of this plant which has been widely discussed and described in various papers and magazines. A. A. Chaney, the superintendent of this plant, was with the Bates Valve Bag Co. for a number of years and during this time he made a number of installations of cement packing plants and studied the problems involved in the United States and various European countries. His experience is embodied in this packing house.

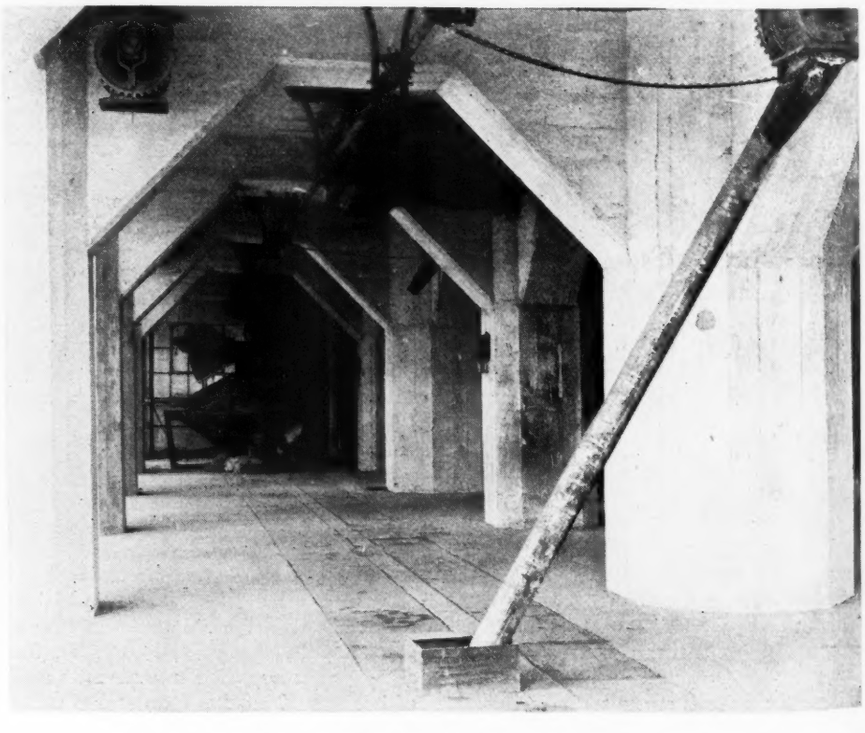
There are four Bates valve bag packers employed, two of which are stationary. These take the cement from the bins in the ordinary way. The others are portable and may be moved to any place on the floor under the silos. Underneath each silo is a tight fitting gate closed by a screw. When it is desired to draw from any silo, one of the portable packers is moved under it on a truck. The hopper of the packer is brought under this gate and the packer is raised by turning four screws that bear on the floor. This brings the hopper up against the gate so that a dust-tight joint is formed. This method of using portable packers was first used in this plant, but like installations are being made in other plants and it will probably be considered a standard method of recovering cement from silos.

However, in this plant, an alternative method may be used. Under each silo is also a feeder of the revolving type which may be driven by a chain and sprocket from a shaft which runs all the way along by the gates. The cement runs from the feeder

uses the same size balls and slugs in the three compartments. The gypsum which is added here comes from a bin which is filled from a car by a Link-Belt carrier conveyor. The lower part of this conveyor is in a small hopper by the side of the track. The gypsum rock is received in box cars which are discharged by shoveling into this hopper and the conveyor first elevates it and then takes it across to the bin from which it runs into the Bartholomew feeder already described.

The finish grinding is carried to where at least 86% of the product will pass a 200 mesh screen. As soon as it leaves the mill it goes by gravity to a 16-in. Link-Belt chain elevator. This elevator and all the chutes leading to and from it are entirely enclosed so that not a trace of dust escapes into the air. The hopper into which the cement falls has a spout on which is a device for delivering the cement through a mechanically operated Bartholomew feeder and the fall of the cement to the conveyor belt which takes it to the packing house is so short that practically no dust escapes at this point. A Merrick "Weighometer" beneath the conveyor belt records the weight of all the cement that goes to the packing house.

The conveyor which takes the cement to the packing house is of Link-Belt make and



Under the silos. A portable packing machine shows at the end

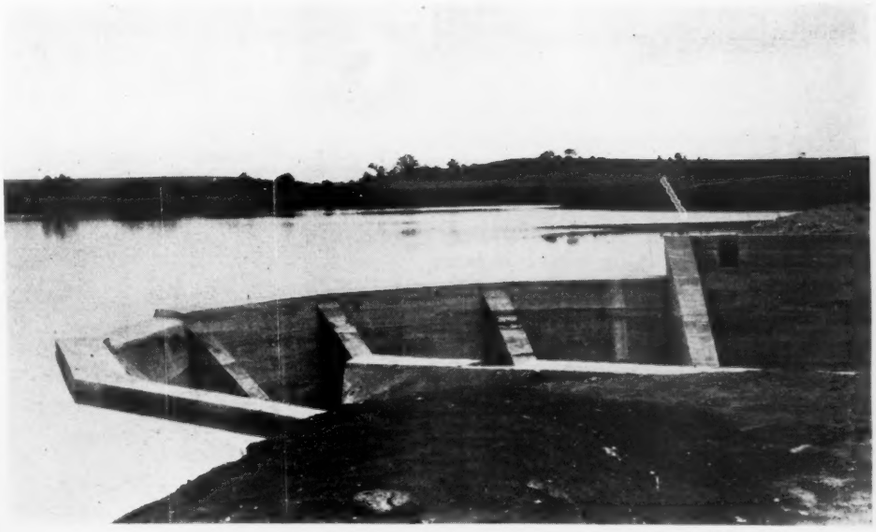
through a galvanized iron pipe into a screw conveyor that is below the level of the floor and is conveyed and then elevated to the bin above the stationary packers.

The whole packing house is excellently arranged. Returned sacks are lifted by a freight elevator to the third floor from which they go first to the sack cleaner. This is a cylinder of wire netting 10 ft. in diameter. Inside are beaters. The sacks are tumbled and beaten as the cylinder revolves and

The new change house

are thoroughly cleaned. This cleaner is enclosed in a dust-tight concrete room.

A door in the side allows the cleaned sacks to fall out on the inspector's table where each sack is inspected and sent to the packing machines or the repair department, or if unfit for repair to the discarded sacks. Only duck sacks are used at present, the use of jute sacks, which were considerably used when the plant was first built, being now entirely discontinued.



Arched dam built to conserve the water supply

The packing house has a very efficient dust collecting system which was worked out by the engineering department of the company.

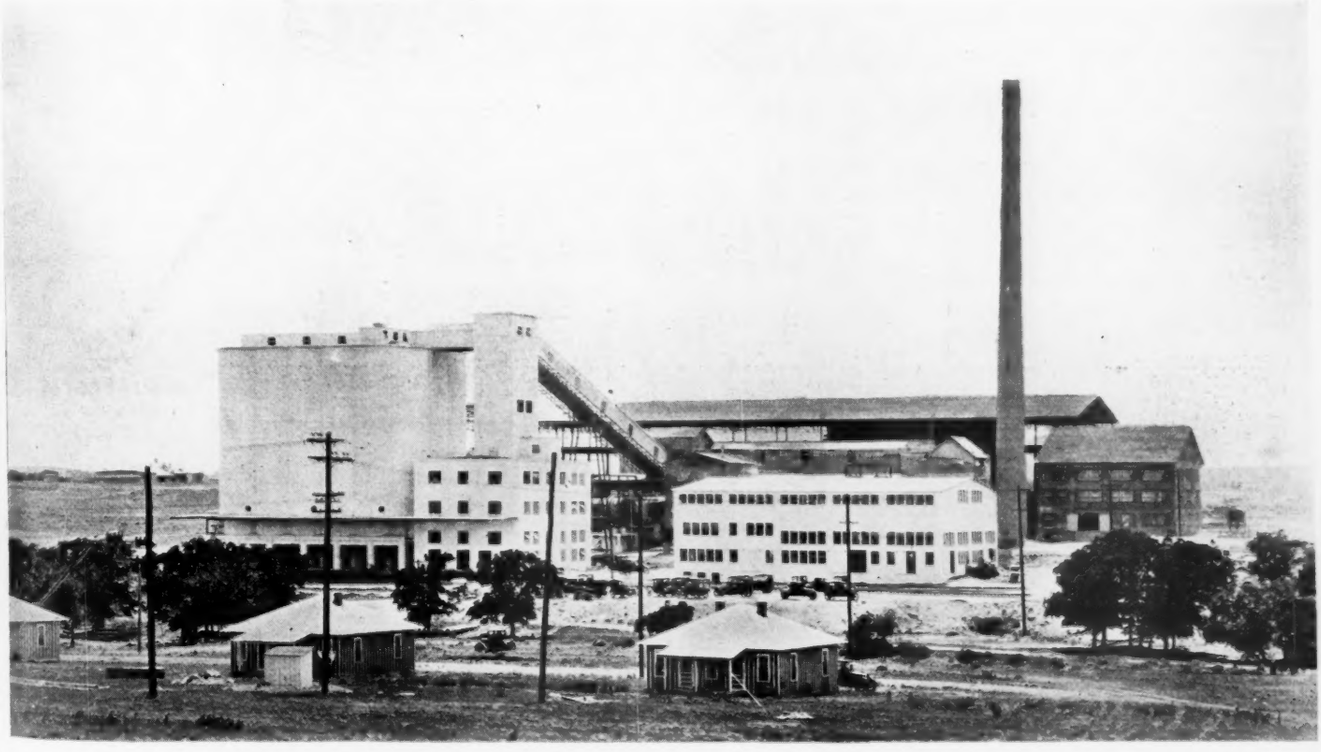
Beyond the packing house is the oil storage which will hold about 6000 bbl. The pumps which send the oil to the kilns are placed in a house erected on one of the tanks.

The water supply arrangements are excellent. A dam has been built across a draw at the rear of the plant and this provides adequate storage during the dry season. But the main supply comes from an artesian well with an air lift. This lift is of the Sullivan type and a Sullivan compressor supplies the air for the lifts and also for agitating the slurry tanks.

The compressors are in the power house. The company buys electric power but houses all transformers, air compressors, main switchboards and other power equipment in a substantial concrete building with glass sides.

Although the resources of a good sized city are close by, the company has found it profitable to install a large and very well equipped machine shop in which all ordinary repairs may be made to even the largest pieces of machinery.

The comfort of the men is well looked



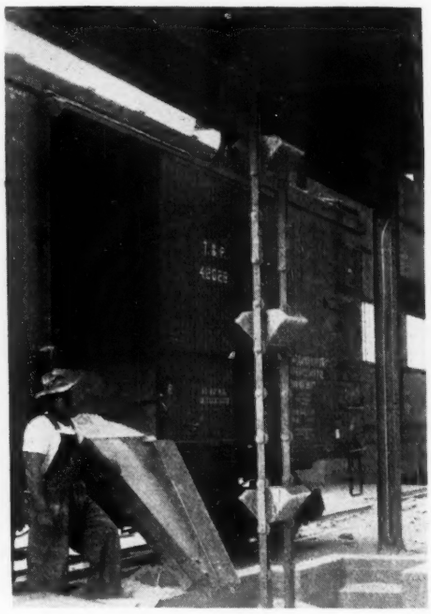
The plant from the east. The buildings in front are the packing plant and machine shop

after. As an illustration of this, one may mention the new wash house and change room which has just been built, a fine structure and well equipped for the purpose. Three classes of labor are employed, whites, Mexicans and negroes. Each of these has to receive especial consideration. For example, at points where drinking fountains are placed there are three instead of one, and these are labeled "white," "Mexican" and "colored." A 25-car garage is being built for employes' cars.

There are many little interesting details about the plant operation. All the motors which have to be stopped and started by the men have "Square D" switches, because this type was found to be more nearly "fool proof" than any other. The lighting of the plant is not left to individuals; the lights are switched on and off all over the plant by a Tork clock. Safety devices are installed wherever there is danger of men coming in contact with moving machinery.

Reinforced concrete has been used throughout for construction, the only exception being the craneway which is of structural steel and the roof above it which is of corrugated steel. Although no special attempt was made to achieve architectural effect the group of buildings makes an attractive picture, especially as the plant stands on a slight rise in the midst of open fields. The stack, 210 ft. high, is of reinforced concrete and of graceful, slender proportions.

Concrete has been used everywhere for roads, walks and for covering the open spaces between buildings. The top soil is a rich black loam that makes a sticky mud in wet weather so the abundant use of concrete in this way is quite justified. A concrete highway of one-half mile in length connects the plant with the main highway that leads from the city of Fort Worth. The distance to the center of Fort Worth is about five miles, but the residential section of the city is much nearer. Many of the employes come to work in their own cars.

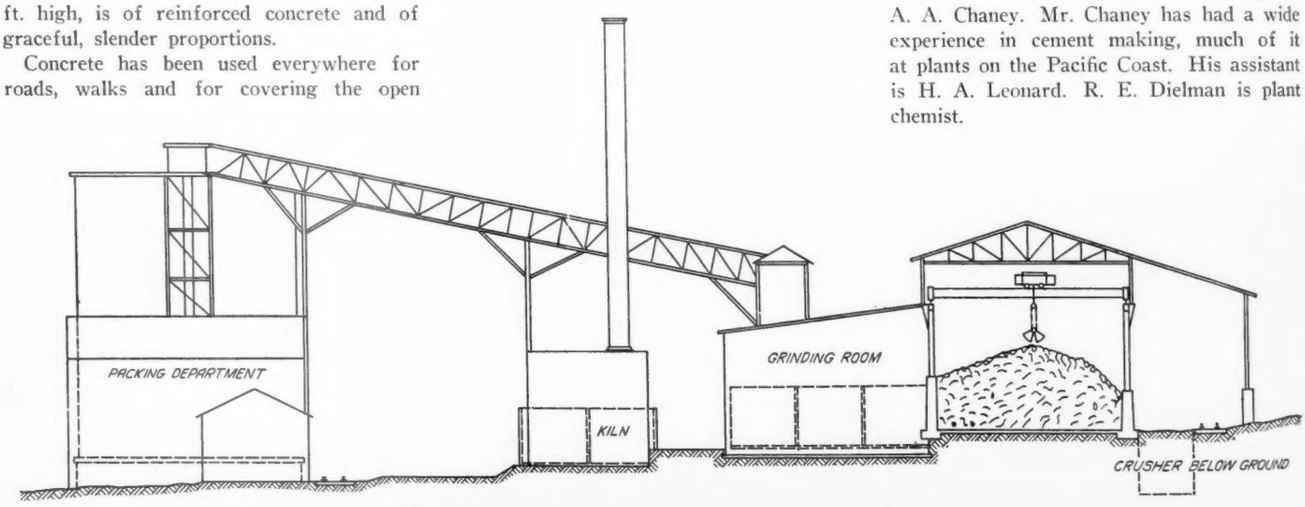


Unloading gypsum

The plant began operations in May, 1925, and it functioned successfully from the start. Those responsible for the operation are rightly proud of the fact that the cement has been of excellent quality from the very first. The laboratory has never had to report a bad "boil." The plant has its own well equipped laboratory which is in the same building as the company offices and the machine shop.

The main offices of the Trinity Portland Cement Co. are in Dallas, Texas, and the company has operated a plant about 17 miles out of Dallas for a number of years. The officers and heads of departments of the company are: W. H. L. McCourtie, president; C. E. Ulrickson, vice-president and general manager; A. S. Parsons, sales manager; O. V. Bartholomew, general superintendent; J. W. Ganser, chief chemist; G. G. Tomlinson, traffic manager; J. J. Horgan, purchasing agent; P. A. Baily, auditor; J. F. Hayden, assistant secretary; Charles Hurst, chief engineer, and W. O. Stuart, electrical engineer.

The Forth Worth plant is in charge of A. A. Chaney. Mr. Chaney has had a wide experience in cement making, much of it at plants on the Pacific Coast. His assistant is H. A. Leonard. R. E. Dielman is plant chemist.



End elevation of plant with craneway in section

Left—Interior of laboratory. Right—Office of superintendent

Quarrying the Ocala Limestone in Florida

The Rock Is Soft and Porous but It Makes a Fairly Good Road Material

By J. R. Thoenen
Mining Engineer, Greenville, Ohio

THE limestone deposits of Florida are preponderently soft, white to cream color, granular, and porous. At no place are commercial deposits found of the hard, dense, variety so common in the central states. There is, therefore, a lack of material similar to the common limestones used so much for concrete aggregate and so plentiful in the north. Some portions of the Tampa formation near Brooksville contain hard boulders of various sizes embedded in a softer matrix which are being exploited, and, after the softer material has been removed by repeated washing they are crushed to make a very acceptable concrete aggregate. For the greater part of the state, however, the formation offering the largest commercial opportunity is the Ocala limestone.

The Ocala formation is supposed to underly the greater part of the state but it comes to the surface only in the northwestern portion of the peninsula. Here it outcrops in a belt roughly 50 miles wide east and west and 130 miles long north and south, reaching from the north central portion of Lafayette county to the southern end of Sumter county. It is found in Lafayette, Dixie, Alachua, Levy, Marion, Citrus, Hernando and Sumter counties. The greatest commercial development of this limestone is in Marion and Levy counties.

The recent unprecedented influx of people into the state in search of winter homes, real estate investment, or pure speculation has greatly augmented the demand for building materials of all classes. As a result many quarries have been opened very recently, old plants have been consolidated and enlarged, and new operators have entered the field. However, congestion of freight due to the same cause has delayed actual development in many cases and lack of railroad equipment has considerably curtailed production in those quarries already in operation. This condition can be only considered as temporary and when relief arrives there is bound to be a large increase

Left—Plant of Florida Shell Rock Co. from the west, showing the north and south and west trestles. Right—The plant from the south pit

Left—Looking into the north pit from the plant. Right—Looking into the south pit

in the production of all classes of rock products. That this is the situation is recognized by several cement companies who have either started construction of plants or have them in contemplation. In the vicinity of Williston in Levy county and Ocala in Marion county there are no less than eighteen quarry companies either operating or organized ready to start as soon as railway conditions permit.

The Ocala limestone, in which most of these quarries are operating, is a very soft, white to cream limestone, granular in structure, and porous in texture, carrying a very high percentage of calcium carbonate. An average of a number of samples ran better than 98% $CaCO_3$ with only a trace of magnesium carbonate and less than 1% of silica. It is uniform in appearance and in most cases is soft enough to be easily crumbled in the hand. There are, however, relatively harder spots in the mass caused by circulating waters or possibly by simple consolidation around fossil remains. Often the surface of the stone where exposed to weathering has become quite hard and brittle. Lenses or boulders of flint sometimes occur in the deposits and when these are sufficiently abundant they form the source of the so-called hard rock quarries. The flint is separated and crushed for road material and concrete aggregate.

The formation as a rule has little overburden. Where present it consists of sand or clay or a mixture of the two. The surface of the stone is irregular owing to erosion pits and pot-holes as may be seen in one of the illustrations. These erosion pits often extend to depths of 25 to 30 ft. and frequently reach depths of 10 to 12 ft. with a diameter of only 3 to 4 ft. This makes stripping laborious and expensive as it can only be done by hand methods.

The quarrying and crushing practice is simple and as the practice is nearly the same at all plants only one typical operation will be described in detail.

The Florida Shell Rock Co.

The crushing plant of the Florida Shell Rock Co. is located half way between two quarries or pits and is about four miles north of the town of Williston on the hard road between Ocala and Lake City. It is served by the Seaboard Airline Railway.

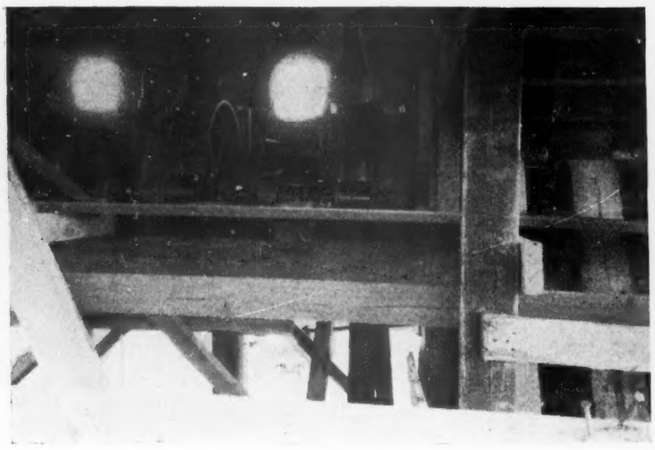
There is at this quarry an average of 18 in. of clay overlying the limestone. This is removed by a North West dragline using a 1-yd. bucket and driven by a gasoline engine. The stripped material is piled to the side of the pits in long windrows. Following the dragline colored laborers with pick and shovel dig out the erosion cavities and load the clay into two-wheel dump carts which are drawn by mules or horses.

For economy of operation two pits were opened, one on either side of the crushing plant. From the crusher hopper long inclined trestles extend to the floor of the pits as may be seen by reference to the accompanying pictures. Pits are carried for comparatively long distances in one direction rather than in circular form. The reason for this is that no pit transportation is used other than the hoists that haul the cars to the crusher. Empty cars return by gravity to the face dragging the hoisting cable after them. In order to avoid the trouble and inconvenience of sheaves and rollers at bends in the haulage way, tracks are kept in as straight line as possible which results in the long quarry pits mentioned. There is a third pit at this point, however, served by a single hoist and car which is really a lateral extension of the south pit. This has a trestle which extends from the crushing plant in a westerly direction with the two other trestles running north and south. Thus the pits have three points of attack which can be extended longitudinally and by slightly altering the track from the bottom of the trestle laterally they may be made to cover a large area before any pit haulage is necessary.

Digging out the erosion pits after stripping the top soil

Cars are hoisted to the crusher after the method used in the phosphate mines, by hoists placed in the top of the crusher building and driven from a single line shaft through frictions. Five of these hoists provide double hoisting facilities for each of the north and south pits and for a single car from the west pit.

The limestone although soft must nevertheless be broken by drilling and blasting before the shovels can handle it. Drilling is done by hand, using a drill something on the order of the hand churn drill. The softness of the rock prevents the use of the common fish tail bit and there has been developed for this vicinity a bit which is shown in an illustration. This consists of a hollow steel cylinder two inches in diameter and slightly tapered from the cutting edge. This is split longitudinally for several inches from the edge which allows the bit to spring and facilitates removal of the cuttings. This cutting bit is welded on the end of a piece of ¾-in. pipe of the desired length and the tool is complete. The operation is to lift and drop the bit in the same manner as a "jumper" or hand churn drill is used. After a few such blows the bit is lifted and the cuttings knocked out. Holes up to 35 ft., the



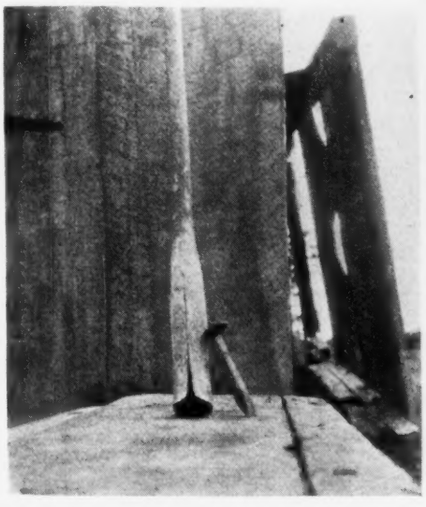
Left—The friction hoists in the upper part of the plant. Left—The south pit after a blast

depth of the quarry face, are drilled in this manner. The same bit is also used for drilling short pop holes in large boulders after the face has been shot. In one of the illustrations men can be seen drilling these short holes in the boulders.

Thirty per cent Hercules dynamite is used to break the face as well as the block holes. Consumption averages about ½ lb. per ton of rock recovered for both primary and secondary blasting.

Broken stone is loaded into the cars by Northwest gasoline driven shovels of the full swing, caterpillar traction type, fitted with ¾-yd. buckets. Cars are locally made, front end dump, with wooden boxes, of 2½ tons capacity. Two cars serve each shovel so that while the loaded car is being hoisted the empty on the second track is returning to the shovel. Broken stone is dumped to a large steel lined, pyramidal hopper over the initial crusher.

The crusher universally used to crush this type of limestone is the McLanahan single roll type fitted with projections or lugs on the face of the roll. These crushers are built locally by the Maddox Foundry and Machinery Co. at Archer, Fla., in various sizes. The initial crusher at this plant is especially constructed to the design of Baxter Morrison, president and general manager of the Florida Shell Rock Co. In order to reach the desired capacity the roll shaft was lengthened and two ordinary rolls



The peculiar churn drill bit used in this soft stone

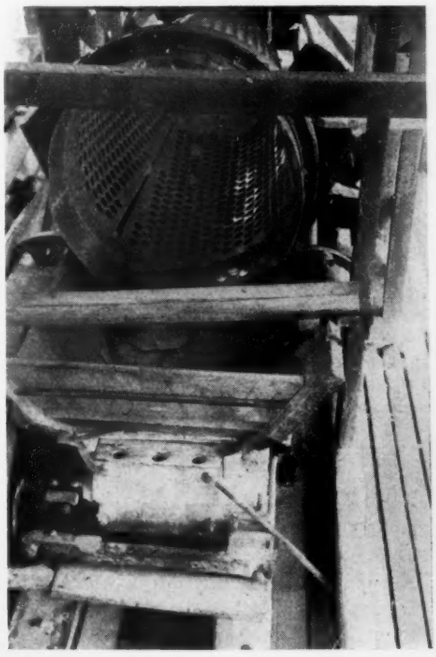
placed on it. This allowed for an opening twice the ordinary length and kept the width the same. The size of the opening on this crusher is thus about 60x10 in.

Broken rock, after passing this crusher, falls to a revolving scalping screen of the open end type with 4-in. round holes. The undersize falls directly through a hopper to railway cars below. The oversize is fed over the end of the screen to the usual single roll crusher and after being crushed it drops to the cars. Railway cars are spotted by a cable and friction hoist which is operated from the ground.

The use of the scalping screen between primary and secondary crushers originated in this field with Mr. Morrison, the prevailing previous practice having been to feed quarry-run material to the single crusher and then run it directly to the cars.

The plant is operated by a single cylinder, 100-h.p. Chandler and Taylor steam engine. Steam is furnished by a 100-h.p. return tube boiler using wood for fuel. Water comes from a drilled well sunk below the crushing plant and operated by a friction drum through wooden pump rods, as is shown in an illustration. Water is found close to the surface and in large quantity wherever the Ocala limestone outcrops.

The proximity of the water level to the surface and the porosity of the limestone



The scalping screen and crusher for the oversize

keeps the rock moist so that there is no dust nuisance, such as is usually found in connection with crushing plants.

The soft character of the stone prevents the use of the usual sizing screens and no attempt is made to market the stone in other than crusher run sizes. This form of limestone is used almost exclusively for building the subgrade for hard roads. Laid from six to twelves thick it readily crushes and consolidates under the road roller, making a firm, compact, and serviceable bed. The compacted bed is then treated with a coating of oil and on this is spread a thin coating of Birmingham slag or hard limestone together with tar or asphalt for the top dressing. With the sand or semi-sandy soil of the state to provide ample drainage and the lack of frost which would cause heaving, this type of road seems to be satisfactory and it is cheaper than concrete.

The Ocala limestone is also burned into a very high grade lime but this industry will be described in a later article.

Ocala Lime Rock Co.

A view is shown of the largest pit of the Ocala Lime Rock Co. located five miles north of Ocala. This company, as recently noted in Rock Products, is a combination of several smaller plants and operates five quarries in the vicinity of Ocala. It is the largest single producer in this territory.

Owing to an increase in the height in the topography at the site of the plant, the face of stone available is considerably higher and approaches 75 ft. on an average. The pit is worked in two levels of approximately 35 ft. each. Drilling is done by hand with "jumper" drills using a thin fish tail bit screwed to a ¾-in. pipe. The bit is provided with a small hole and the pipe handle filled with water which lubricates the sides of the hole and keeps cuttings from wedging the bit. One man with these drills will drill from 125 to 130 ft. per day, drilling holes 30 ft. deep. Snake holes are placed at the bottom of the bench about 5 ft. apart and drilled 18 ft. deep. These holes are drilled with Ingersoll-Rand jackhammers using auger steel. Twenty per cent dynamite is used, the vertical holes requiring 120 sticks each and the snake holes 80 each. About 3½ tons of stone is procured from each pound of dynamite.

Broken stone is loaded by Erie full re-

Pump rod for the water well

volving caterpillar traction shovels with ¾-yd. buckets, to 2-yd. western side dump cars. Cars are hauled to the foot of the incline by 4-ton Plymouth gasoline locomotives where they are picked up by cable from friction drum hoists on the surface and hoisted to the crushers. The crushing is done by single roll McLanahan type 30x12-in. crushers with 3½-in. opening. These are built by the Ocala Iron Works. No screens are used, the crushed material falling directly to cars.

This company plans to rearrange this pit and extend it in line with the incline so as to do away with the pit locomotives. The daily capacity of the five plants of this company is 3000 tons, and of the district about 15,000 tons.

Brower's Lime and Phosphate Co.

This company operates two pits, one about 2½ miles north of Ocala and the other just south of the city. No road material is produced at the southern plant, all the product being dried and ground for asphalt filler. The quarrying operations are similar to those already described. After passing the initial single roll crusher the rock is elevated to a revolving screen fitted with a wire screen of 1-in. square mesh. The oversize from this screen is sent to a McLanahan type single corrugated roll crusher and re-elevated to join the undersize on a conveyor belt which takes it to the floor of the drying mill. Here it is shoveled by hand to a short conveyor belt which delivers to the elevator feeding a 5x30 ft. cylindrical dryer, direct fired with wood and coal. The material is partially dried here and then passed to a second 6x30 ft. dryer of the same type for completion of the drying operation. Provision is made for use of either dryer singly but it has been found that this often requires too high a temperature to remove the moisture and that a lower heat over a longer period results in better economy.

After drying, the material is elevated to a storage bin from which it is fed to two Fuller-Lehigh pulverizers and ground to about the fineness of cement (85% through 200 mesh). The product is then sent to the finished product bins and from there shipped in bulk in box cars to Tampa for asphalt filler. The capacity of this plant is about 60 tons in 12 hours.

Pit of the Ocala Lime Rock Co.

Quarry Accident Record in 1924

ACCIDENTS at quarries in the United States in the calendar year 1924 resulted in 138 deaths and 14,777 injuries, according to statistics compiled by the Bureau of Mines, Department of Commerce. The figures compare with 142 deaths and 14,990 injuries at the quarries during the year 1923. The fatality rate for 1924 is the lowest recorded since the Bureau of Mines began, in 1911, the compilation of accident data for the quarry industry. The non-fatal injury rate, while slightly below that for 1923, was somewhat higher than the rate prevailing in recent years. The fatality rate for 1924 was 1.63 per thousand full-time or 300-day workers; the injury rate was 175.03. In 1923 the fatality rate was 1.68 and the injury rate was 176.04.

Reports from the operating companies showed that the quarry industry employed 94,242 men during the past year, a gain of 2% over 1923; that the volume of work done by the employes was equivalent to 25,327,858 man-shifts, a loss of 1%; and that the employes average 269 workdays per man, a loss of 7 days per man.

The slight decline in the fatality rate in 1924 was due to a reduction in the rate for quarries producing limestone, slate and trap rock. Increased fatality rates were indicated for quarries producing cement rock, granite, marble, and sandstone and bluestone. Lower non-fatal injury rates were shown for cement-rock quarries, but all other classes of quarries showed higher rates than in 1923.

Operations inside the quarry pits employed 59,126 men, 3% more than in the previous year; these employes performed 15,151,796 man-days of labor, a gain of less than 1%; the men averaged 256 workdays each, a loss of 7 days per man. Accidents to the workers "inside" the quarries killed 96 men and injured 8990 men, resulting in a fatality rate of 1.90 per thousand 300-day employes as compared with 1.97 for the previous year, and in an injury rate of 178.00 as compared with 178.11.

"Outside" the quarries, at crushers, mills, rock-dressing plants, etc., the employes numbered 35,116, or 151 less than in 1923; the men performed 10,176,062 shifts of labor during the year, a decline of 3%; and the average workdays per man was 290, a reduction of 7 days per man. Accidents to the "outside" employes resulted in 42 deaths and 5787 non-fatal injuries, and represented a fatality rate of 1.24 and an injury rate of 170.61, as compared with previous year's fatality rate of 1.26 and injury rate of 173.05 per thousand 300-day workers.

Of the 14,915 accidents reported by the entire quarry industry during the past year, 138 (0.92%) caused death, 13 (0.09%) caused permanent total disability, 457 (3.06%) caused permanent partial disability, 2708 (18.16%) resulted in temporary disablity lasting more than 14 days, and 11,599 (77.77%) resulted in temporary disability exceeding the remainder of the day or shift but not exceeding 14 days.

The main causes of all accidents inside the quarries were handling rock at the face, flying objects, haulage, falls or slides of rock or overburden, machinery, falls of persons, falling objects, and drilling and channeling, and timber or hand tools, in the order stated. Accidents outside the quarries were due mainly to flying objects, machinery, falling objects, hand tools, falls of persons, handling rock, and haulage. The principal causes of accidents resulting in death to employes inside the quarries were falls or slides of rock or overburden, explosives, falls of persons, haulage, and machinery, while accidents resulting fatally to the employes at the outside plants were due mainly to machinery, haulage, falling objects, falls of persons, and burns.

Road Building May Be Curtailed in Ontario

ACONSULAR report says that, according to a press announcement from the Provincial Highways Department, Ontario road building will be curtailed to a considerable degree during 1926. It is said that the present program of construction is well caught up and that operations next year will be much less extensive. It is understood that the Bigg's plan of capitalizing motor license fee revenue for highway purposes, over a period of 40 years, has been abandoned. This matter is receiving the present attention of the Provincial Treasurer and it is possible that his general sinking fund plan will take special cognizance of the problem of retiring highway indebtedness, probably in some measure of the current revenue surplus of the department.

Manufacture of Hydraulic Lime in France

Description of the Sigonce, Basses Alpes, Plant as Reconstructed in Accordance with Modern Practice

By E. C. Blanc, Construction Engineer
Gieres, France
(Translated by Margaret Arronet, of the Structural Materials Research Laboratory, Lewis Institute, Chicago, Ill.)

THE issue of ROCK PRODUCTS of May 17, 1924, contained a description of a model lime manufacturing plant. This description anticipated conditions and has not been adhered to in all of its details in any one of the existing plants.

The plant which we are about to describe was installed by the author and in its general layout resembles the model plant referred to above. However, it is not a new plant. On the contrary, it is a very old plant gradually rebuilt and modernized without interfering with its production.

The plant is located in southeastern France at Sigonce, Basses Alpes, and is owned by the firm P. Boursier et Fils, Marseilles.

Mr. P. Boursier has just completed with great success the raising of the warship *Liberte* sunk in the Toulon harbor in 1912. He is the owner of a number of shops in Toulon devoted mainly to the reconstruction of ships. The entire equipment of the lime plant, including machinery, hoppers, woodwork, etc., was furnished by this firm.

The Sigonce lime plant was purchased by the firm in 1921, in the condition illustrated in Fig. 1. Complete remodeling of the plant was decided upon immediately and, after passing through the intermediate stages, was successfully completed by the author.

Quarry

The limestone constituting the material used in the manufacture of hydraulic lime at Sigonce is a part of the Aquitania lacustrine deposits belonging to the tertiary formations. The rock has been quarried for a long time, as local archives show that it constituted the material used in building the *chateau* of the Benedictine Monks, the feudal lords of Sigonce, erected in 921.

The present quarry has a face of 650 ft. and an average height of 65 ft. Its capacity is estimated at 2,500,000 cubic meters (3,250,000 cu. yd.) and the rock is quite uniform in composition.

The quarrying is quarried out by hand (with crow bars) and the rock is hauled to the plant a distance of 700 ft. on a narrow gage track.

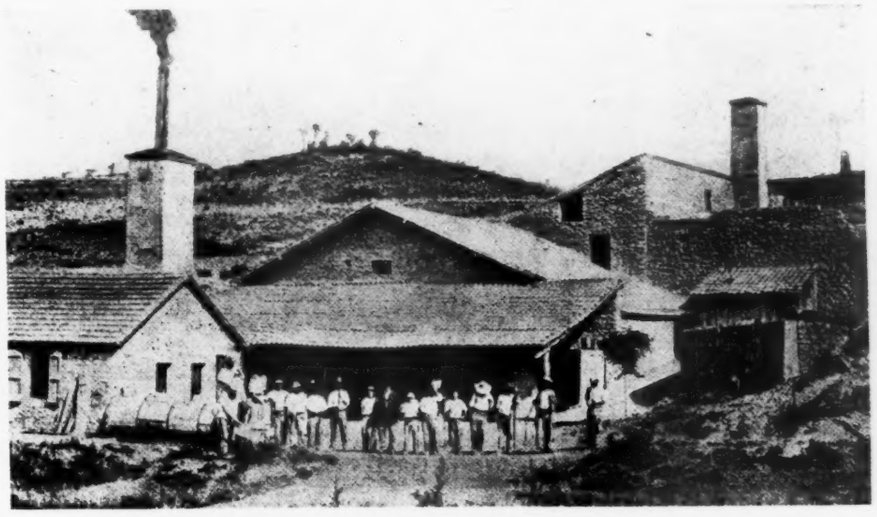


Fig. 1. The plant which was built in 1921. The quarry is known to have produced limestone in 921, 1000 years before

Calcination

Calcination is in kilns which are charged with a mixture of fuel and rock. The plant has four old kilns of ovoid type, 8 ft. in diameter and 30 ft. high. These kilns were remodeled by the addition of downdraft stacks. The limestone is dumped from the cars at the upper level of the

Fig. 2. The new plant, built in 1924, which contains the four old kilns, reconstructed, and a fifth kiln which is expected to double the production

kiln where the fuel is likewise discharged by trucks. The kilns have a total daily capacity of around 30 tons.

The fifth kiln which is expected to double the production is now under construction. This kiln, of the Mignon-Rolland-Bourgoin type, is shown in Fig. 10. It is cylindrical in shape, 12 ft. in diameter and 40 ft. high, provided with a double lining of refractory brick. The air intakes are located at one-half the height and are

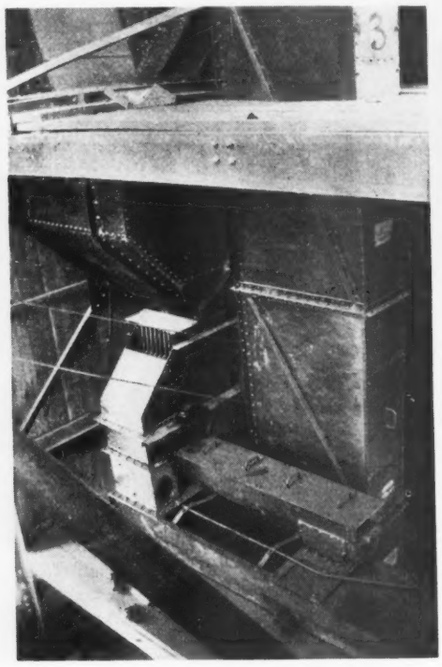


Fig. 3. The hydrator, with the distributing bars and screw conveyor above

connected with the recuperative chamber between the two rows of refractory brick. Thus hot air is admitted to the kiln in the combustion zone.

Fuel and limestone are charged in alternate layers at the top which is always open. The stack is located in the center of the kiln and insures good draft.

Four discharge holes at the bottom are provided with vertical cooling grate and horizontal discharge grate. The latter consists of steel bars with projections. The end of each bar is made to fit a crank which causes rotation of the bars and permits the lime to drop into the hopper below.

The kiln operated continuously is capable of a production of 40 tons a day with a daily consumption of fuel of 10 to 11% by weight of the lime output.

The lime is transported by a Marcus conveyor of the impulse type, which feeds the jaw crusher. The maximum clearance between the jaws of the crusher is ¾ in. The crushed burned lime falls on an elevator which takes it up to the hydrator.

Hydration of Lime

The crushed material is discharged into a metallic hopper placed above the silos in which hydration is carried to completion. A revolving screen, operated by gearing, distributes the lime uniformly

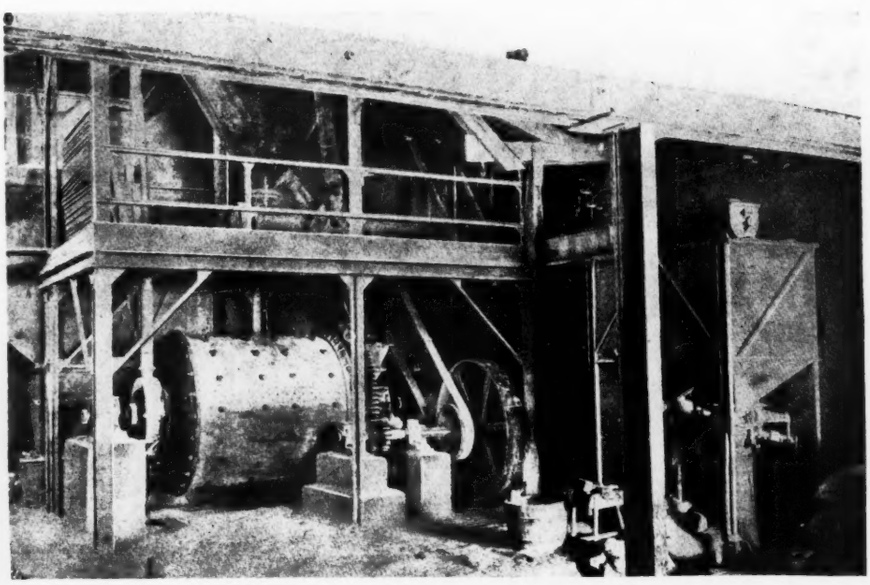


Fig. 7. The coarser particles and the "grappiers" are fed into this ball mill from the air separator and ground and passed again to the air separator

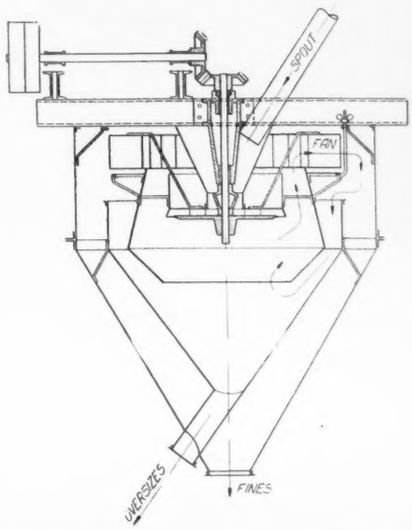


Fig. 8. The air separator by which oversize is removed from the hydrated lime

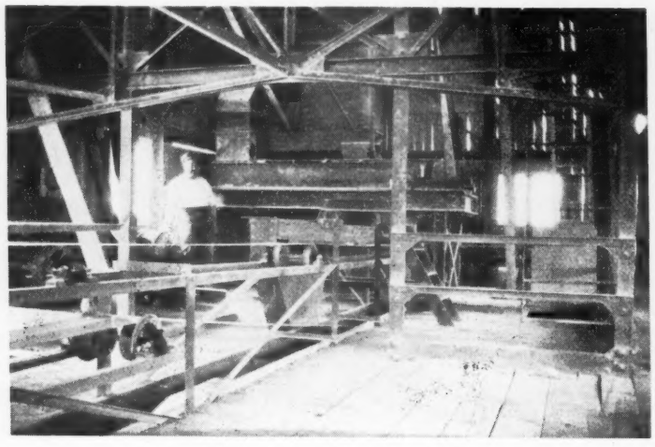


Fig. 4. View of the hydrator and the steel belt conveyor by which the hydrated lime is removed

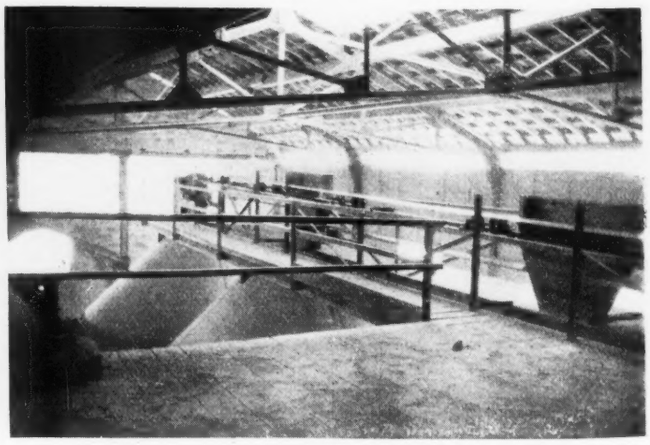


Fig. 5. The steel belt distributes the hydrated lime to the four silos where the lime remains until hydration is completed

and separates the dust which falls between the bars of the screen on a small screw conveyor about 4 ft. long. The crushed lime falls into the hydrator, 9 ft. long, where it is immediately placed in contact with water. The water is admitted by means of a valve and the quantity is regulated in proportion to the lime output (10% by weight).

Just before the lime leaves the dis-

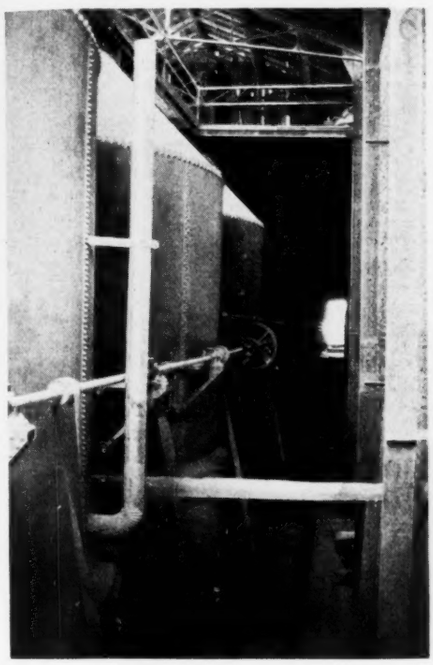


Fig. 6. The steel silos in which the hydrated lime is stored

charge end of the hydrator, the fine powder transported by the screw conveyor is incorporated with it. Thus the powder is hydrated uniformly by the excess water remaining on the surface of the lime particles while it would be drowned in direct contact with water.

The hydrated lime falls on a steel belt conveyor of Sandvik type (see Fig. 5) with belt width of 12 in. and 60 ft. centers. The power is furnished by a pulley about 40 in. in diameter. The conveyor has three points of discharge with automatic feed, and it empties itself by gravity into the fourth silo.

The four silos, of metal construction, have a capacity of 110 tons each. They thus could store the entire output of the plant for 8 or 10 days, which is sufficient for uniform and complete hydration of hydraulic lime.

The slaked lime (which is a mixture of powder with 20 to 30% of clinker or "grappiers" is discharged from the silos by a chain conveyor (drag conveyor). Screw conveyors, formerly installed, did not give satisfactory results.

The lime falls on an impulse conveyor, Marcus type, 60 ft. long. The section of the conveyor is 18 in. wide and 6 in. deep. The course is 6 5/16 in. wide and the number of shocks is 60 per minute. Transportation of a mixture of powdered material and clinker by this method is very difficult, as it makes the transported material compact and adhering to the conveyor. For this reason the original speed was reduced (from 85 to 60 strokes per minute) and the impact of the shocks was increased.

Grinding

The impulse conveyor discharges into a hopper from which the material falls on an elevator which feeds the mill.

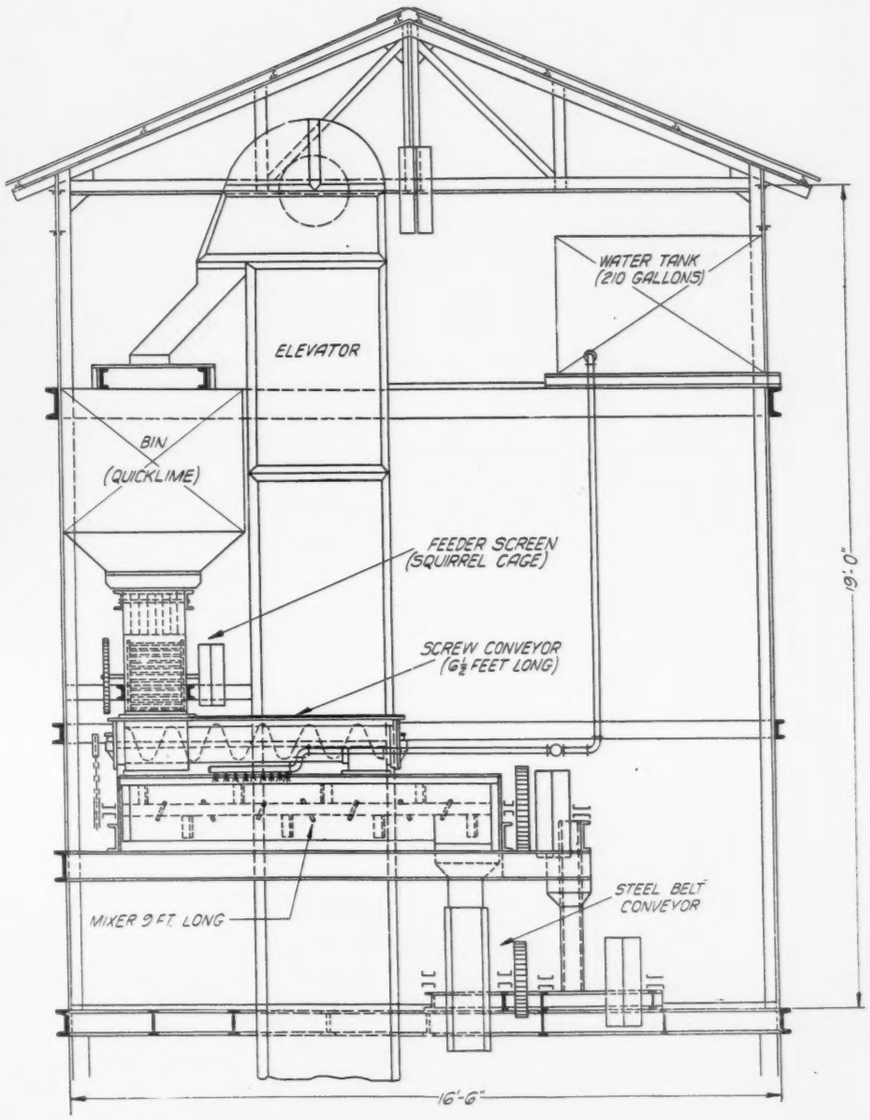


Fig. 9. A section which shows diagramatically the hydrator with the arrangements for screening and feeding the hydrated lime

The elevator discharges into a small screen with 5/16 in. perforations and a dust jacket, where the coarse grappiers are separated. These fall directly into the mill while the fine particles pass into the air separator. (Fig. 8.)

The latter separates the dust (hydrated lime) while the small grappiers are also fed into the ball mill. The mill has a diameter of 5 ft. 7 in. and is 6 ft 3 in. long. It is provided with steel balls whose total weight is about three tons. (Fig. 7.)

The product of the mill falls on the elevator and is taken to the separator.

The mill thus forms a closed circuit with the separator and the latter furnishes a homogeneous product of a fineness corresponding to 14% residue on the 190-mesh sieve, conforming to official specifications.

Packing and Shipping

The ground lime is now conveyed by a screw conveyor to small hoppers with automatic sacker discharge. Shipments are made in sacks of 50 kg. Transportation to the railroad station, five miles distant, is made by truck.

Plans have been made for storing the finished product in two silos of the same type as used for hydration. This installation is shown on the general layout in Fig. 10.

Properties of Sigonce Hydraulic Lime

Results of tests of Sigonce lime, as reported by the Laboratoire national des Ponts et Chaussees, are as follows:

The chemical analysis of the hydrator product is:

	Per Cent
Soluble silica SiO_2	26.32
Insoluble silica (sand)	0.88
Alumina Al_2O_3	3.60
Iron oxide Fe_2O_3	1.15
Lime CaO	56.40
Magnesia MgO	0.97
Sulfuric anhydride SO_3	0.85
Loss on ignition	8.35

Hydraulic index: 0.52.

The physical characteristics are:

Fineness: 1.8% retained on the 900-mesh sieve (per sq. cm.), 14.2% retained on the 4900-mesh sieve (per sq. cm.).

Unit weight: 0.89 (apparent density).

Time of setting: In moist air, initial, 5 hours; final, 19 hours. In fresh water, initial, 6 hours, 20 minutes; final, 34 hours.

Strength of 1-3 mortar: Tension at 7 days, 115 lb. per sq. in. Compression at 7 days, 725 lb. per sq. in.

Power Plant

The plant is operated by a central power plant using producer gas. The installation comprises two motors of 28 and 50 hp. respectively. A 150 kw. transformer was recently installed permitting the purchase of local current.

The entire equipment of the plant, excepting the motors, was furnished by P. Boursier et Fils, Toulon. The plans for the mill were submitted by J. E. Duchez, consulting engineer, Albi. The design of the modern kiln was the work of Mignon-Rolland-Bourgoin, Paris. All equipment pertaining to hydration, details

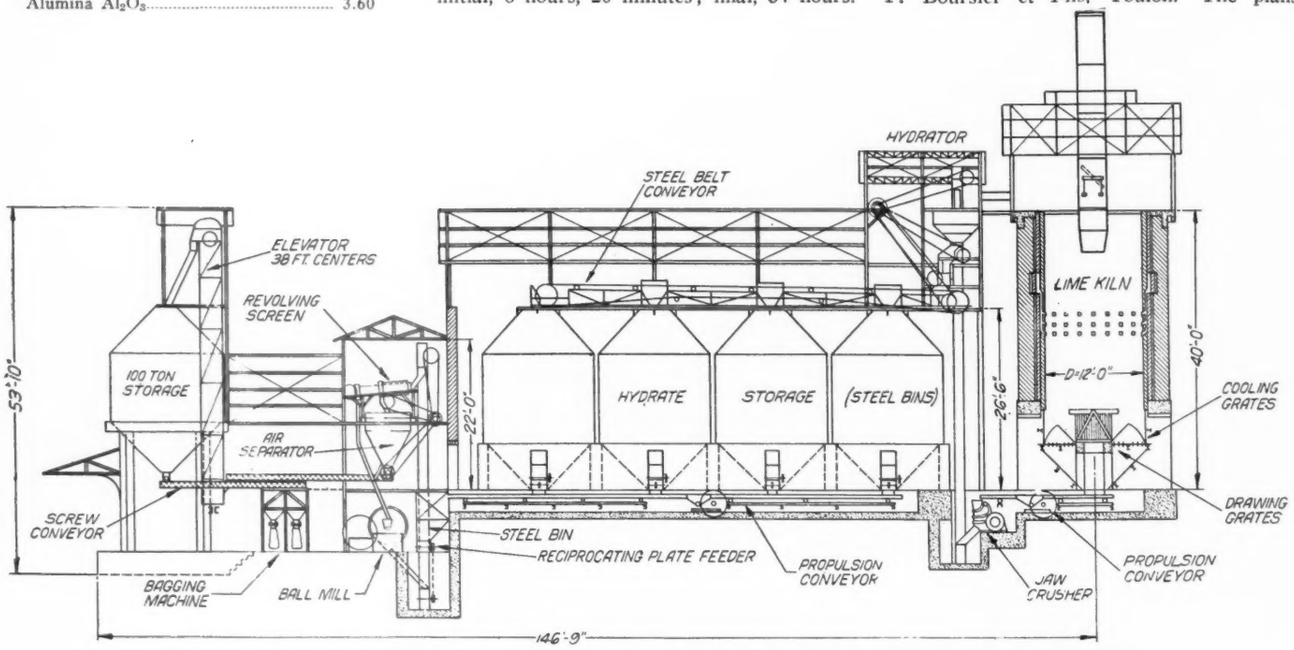


Fig. 10. Sectional elevation through the entire plant by which the passage of the lime from the kiln to the storage may be traced

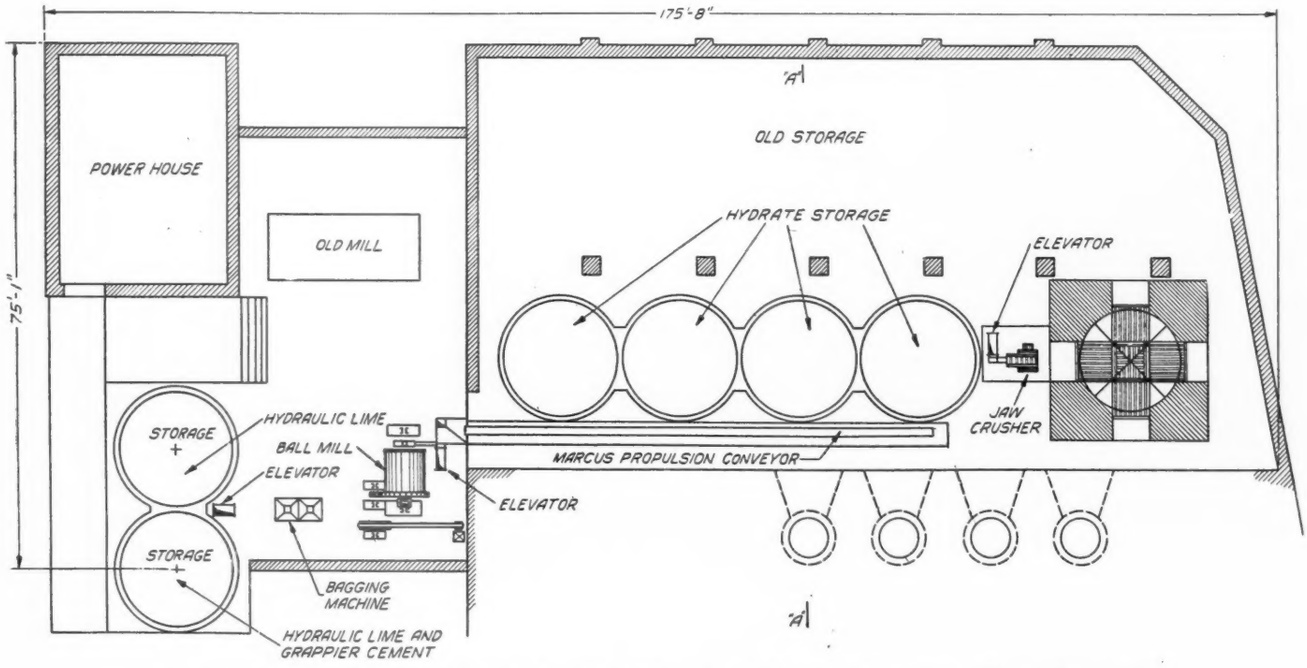


Fig. 11. A diagram which shows in plan the hydrating machinery with storage silos and conveyors drawn to the same scale as the elevation above

of operation and the installation of the entire equipment were planned and executed by the author.

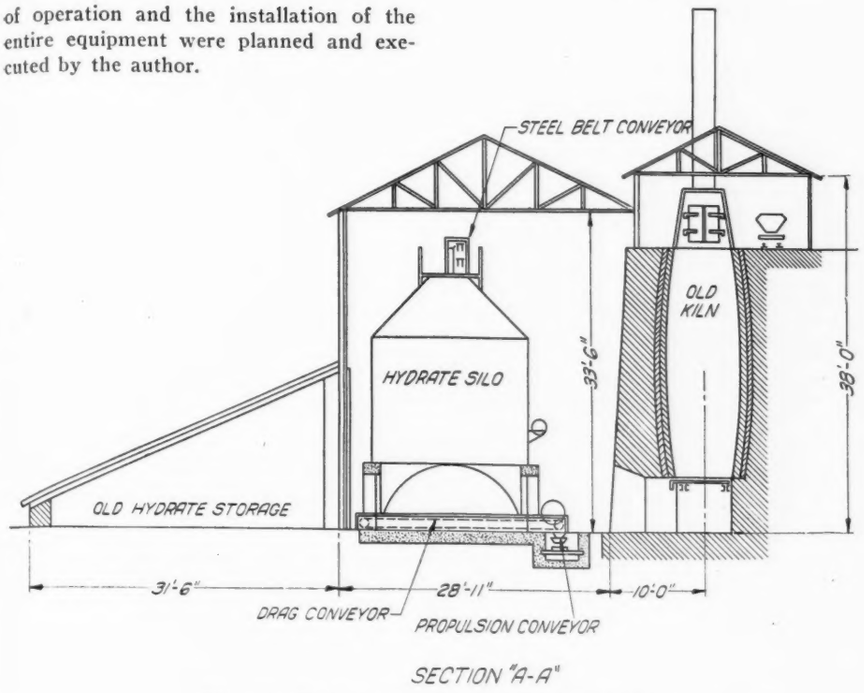


Fig. 12. Section through one of the old kilns

Management of Old Glacial Soils Requires Use of Lime

THE needs of the old glacial soils south of the glacial line are acute. They are suffering from the infirmities of old age. Their rejuvenation rests jointly upon several improvement practices.

Liming a Major Step.—The ravages of long continued leaching—30 times as long as the sister soils farther north—has brought on limestone impoverishment. In consequence, liming is a fundamental need over most of this area. For the grey, level, Clermont silt loam, which is the prevailing type, the requirement is almost universally from 2 to 3 tons of fine limestone per acre. Fully to satisfy those smaller areas of dark soil, that occur as island-like bodies within the Clermont silt loam area, as much as 2½ tons are required. Roughly speaking, 1½ tons per acre are needed on the lightly rolling, brown Rossmoyne soil. Little need is experienced on the Cincinnati soil adjacent to streams due to erosion having scalped the land, exposing the lime portion of the deep zone.

In restocking these lands with lime, one of two alternative plans may be followed:

1. Satisfying the full need at one application.

2. Applying a fractional treatment regularly every 2 or 4 years. Each of these has its advantages and disadvantages. The full treatment will, of course, yield the larger acre-return while the fractional dose pays the higher return per dollar invested. In consequence, one with plenty of working capital will choose the first, while the farmer with limited finance will be forced to adopting the second course, using from ½ to 1 ton of limestone per acre preceding each legume.—John A. Slipher in *Timely Soil Topics* (Ohio State University).

Effect of Heat on Strength of Calcined Kieselguhr-Portland Cement Mixtures*

FLAT slabs of kieselguhr-portland cement mixtures are of use in certain types of construction for heat insulation. Investigation was conducted to find the ability of these slabs to support their own weight and additional weight at fairly high temperatures.

California kieselguhr, 100% through 4 mesh and portland cement, 82.8% through 200 mesh were mixed dry in 4:1 proportions. Then 65% by weight of water was added, mixed and the whole pressed by hand into a mold 2x2x10 in. The block resulting was covered for two days with a damp cloth and aged in the air for 28 days. Three different blocks from three different batches were tested.

Results

The modulus of rupture of the bars was determined from the following formula. Results are indicated in inch-pounds.

$$\frac{3Pl}{2bd^2}$$

where P = breaking load in pounds; l = length of span in inches; b = width of bar in inches; d = depth of bar in inches.

The differences of strengths of the different batches indicate differences in forming conditions although efforts were made to keep the conditions the same.

Conclusions

The foregoing results indicate:

1. Great decrease in strength between room temperature and 100 deg. C. This might be accounted for by a partial dehydration of the cement at this temperature.

2. That the strength remains practically constant beween 200 and 500 deg. C. The adhesion between the kieselguhr and the cement is so great that in these bars heated below 500 deg. C. the fracture is through the kieselguhr grains rather than at their surfaces.

3. A sharp decrease in strength between 500 and 600 deg. C.

4. That the strength remains practically constant between 600 and 900 deg. C.

5. That there is a slight increase in strength at 900 and 1000 deg. C. This is probably due to initial sintering.

6. That there is a rapid decrease in strength above 1000 deg. C. Further sintering or melting around the grains causes a decided change in structure. The light siliceous kieselguhr is dissolved by the glass which is formed at these temperatures. This glass occupies so much smaller volume that the particles no longer have contact and the result is a weak structure.

*Abstract from J. Amer. Cer. Soc. **8**, 784 (1925).

TABLE SHOWING BREAKING STRENGTHS AT DIFFERENT TEMPERATURES

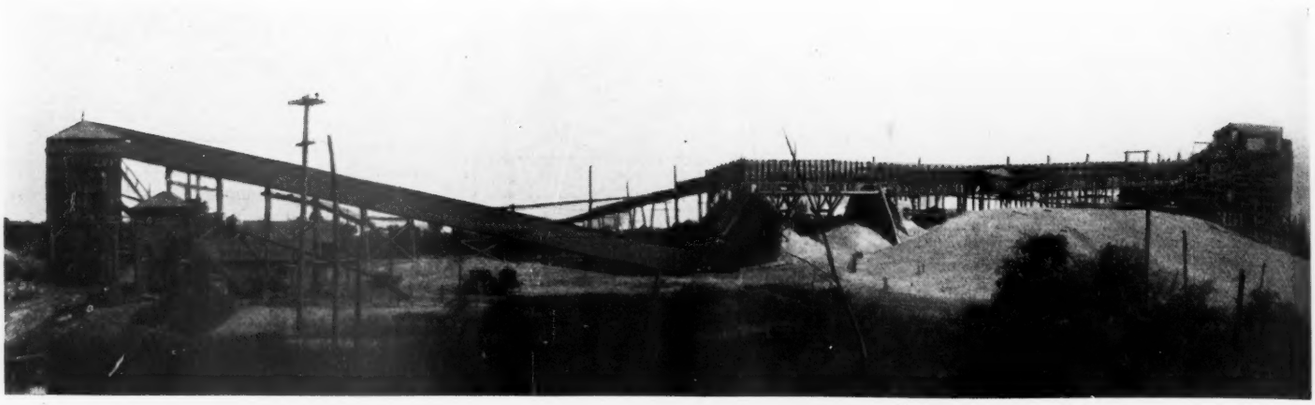
Temp., °C.	Batch 1		Batch 2		Batch 3			
	Bar A, lbs. to break	Bar B, lbs. to break	Bar A, lbs. to break	Bar B, lbs. to break	Bar A, lbs. to break	Bar B, lbs. to break	Av. lbs. to break	Modulus of rupture
Room temp.	206	222.75	161	145	207	122	177.2	265.8
100	70	82.75	84.25	42	72	lost	70.2	105.3
200	29.9	16	13.25	22	27.5	26.5	22.5	33.8
300	33	27.25	20.25	13.5	24	30.5	24.7	37.1
400	23.75	20.5	20	32	16	30.6	23.8	35.7
500	21	28.5	9.5	5.25	44	40	24.7	37.1
600	17.25	13	8.25	9.4	21.5	15.5	14.2	21.3
700	4.5	13.6	11.5	14.25	33	13	15.0	22.5
800	9.9	8.6	7	10	19.25	20	12.5	18.8
900	19	13.5	13.5	10.75	20	23	16.6	24.9
1000	21.1	20.4	7.75	12.75	7.5	17	14.4	21.6
1100	9.75	14.25	4.5	8.1	23.75	*	10.1	15.2

*Broke in furnace.

Highway Research Board to Hold Annual Meeting

THE fifth annual meeting of the Highway Research Board of the National Research Council will be held at Washington, D. C., on December 3 and 4.

C. M. Upham is director of the board and the executive committee consists of A. N. Johnson, chairman; W. H. Connell, vice-chairman; T. R. Agg, H. C. Dickinson, A. J. Brosseau, T. H. MacDonald and W. Sparagen.



Panorama of the Koenig plant. The loading bins are at the left and the sand flume and screening plant at the right. The conveyor runs all the way under the stockpile and up to the top of the loading bin

Dredging in the Oxford Michigan District

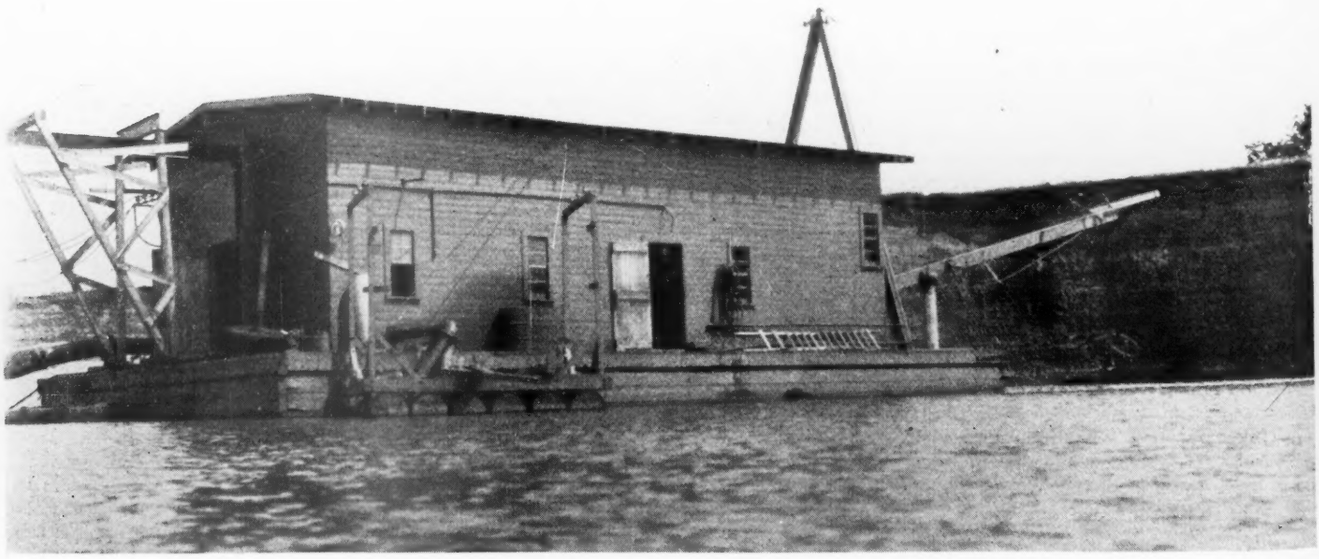
Operation of the P. Koenig Coal Company Embodies Developments Which Have Come from Years of Experience in That Locality

WITH one exception the plant of the P. Koenig Coal Co. is the newest of the sand and gravel plants in the well-known district near Oxford, Mich. It is interesting because in one way it embodies the experience of the district. G. E. Bentley, the superintendent, who had charge of its building from the day the first stake was put in the ground, has worked in the Oxford district for a number of years as plant superintendent and in other capacities, and he drew freely on this experience in the construction of this plant.

A suction dredge is used to dig the bank material. The deposit varies somewhat in depth, but at the part that was being worked when the notes for this article were made it was 65 ft. deep. About half of this is below water. The bank is of fluvo-glacial origin, showing the stratification of seasonal flows, and is about 40% gravel. The oversize is small in quantity. The top soil is so light that stripping is not practiced and both sand and gravel are freer from clay than is usual in deposits of this nature.

The hull of the dredge is of Oregon pine (or fir) 60 ft. long, 36 ft. wide and 5 ft. deep. The dredge draws about 2 ft. with everything aboard. The machinery is all enclosed in a cabin, and an A-frame at the bow with a 40-ft. boom supports the suction.

The pump and direct-connected motor are



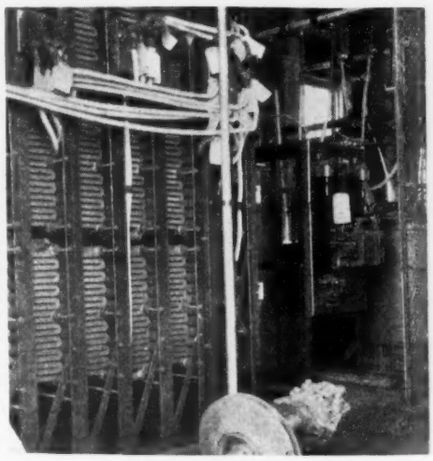
The Koenig dredge which contains a 15-in. pump driven by a 500-h.p. motor

mounted at about the center of the dredge. Forward of the pump is a raised platform on which is the hoist and the bank of levers by which the suction is handled and the dredge moved. The operator stands here and has a clear view through large windows in front and at the side.

The pump is a 15-in. Morris with a 51-in. runner and the motor is a 500-h.p. Allis-Chalmers. It is of the variable speed type using 4600-v. current stepped down from 21,000 v. at the transformers on shore. At the present distance from the plant the pump runs 514 r.p.m. or 505 r.p.m. under load. Pipe line velocity is kept at 14 ft. per second.

The motor has an automatic start and stop system furnished by the Sundh Electric Co. All that the operator has to do to start or stop is to press a push button, the same way in which he would put on the lights in a room. All the necessary switching for building up speed is taken care of automatically by the Sundh devices.

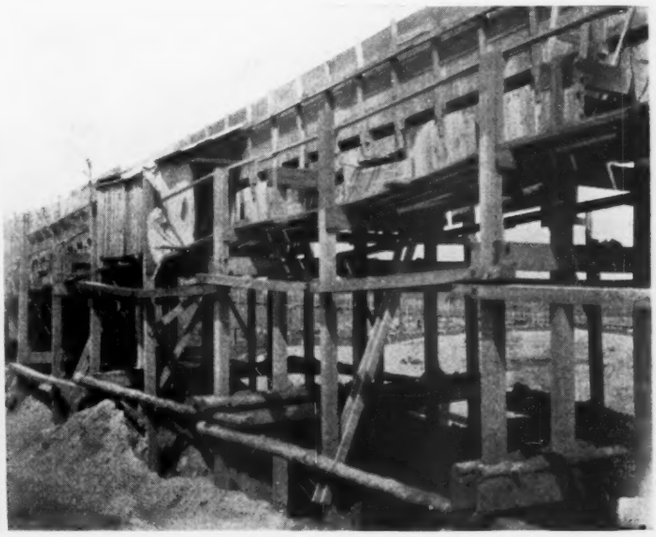
The hoist is a three-drum Flory, electrically driven. A 6-in. Morris water pump for high pressures directly connected to an Allis-Chalmers motor furnishes water for priming and for the jet head of the suction.



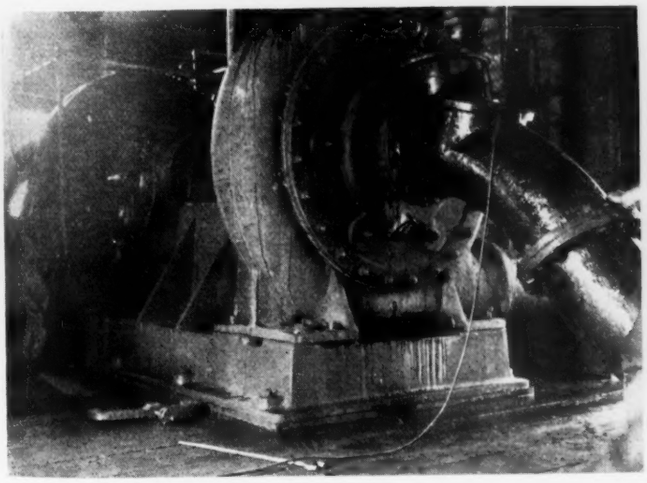
The automatic switch system by which the pump is started and stopped

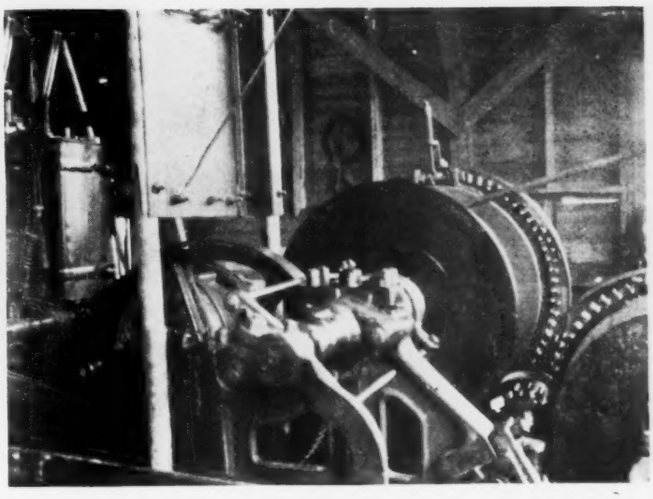
This jet head was devised for use in this field by the Morris Machine Works. It was first used at the Ward plant and it was so successful there that other plants have adopted it. It consists of a bell-shaped casting around the suction bonnet of the dredge in which are ⅞-in. nozzles, set on the edge of the bell, and arranged to shoot jets into the sand and gravel around the suction. The effect of these jets is to loosen the sand and gravel so that suction can pick up more solids. Eighty pounds pressure is used on the jet at present but it is the intention to increase this pressure to 125 lb. A 6-in. pipe, carried by the side of the suction pipe, brings the water from the pump to the jet head.

The suction pipe is 15 in. diameter and 30 ft. long below the rubber connection that unites it to the pump suction. At the end a 22½ deg. ell is turned back to pick up the material that would otherwise tend to slide under the dredge. Bars across the mouth of the suction keep large stones from entering and whenever a large stone is held against these bars by the force of the suction, the



Left—The pontoon line. The pontoons are made of a frame resting on steel cylinders. The pipe is of sheet steel welded to the company's specifications. Right—Detail of sand flume



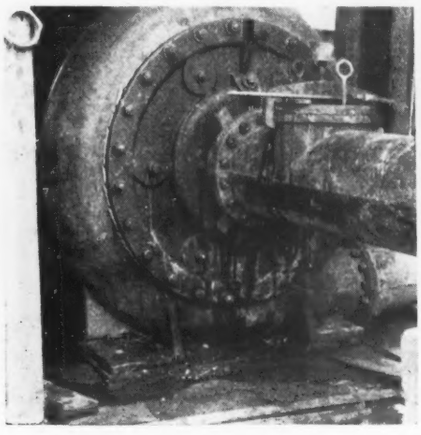


Left—The 15-in. pump and 500-h.p. motor on the dredge. Right—Hoist for handling suction and lines

suction pipe is pulled up and an iron basket is lowered so that the stone will drop into it as soon as the pump is stopped. This stone basket is hung from the end of the suction boom and operated by a small hoist in front of the cabin on the deck.

An interesting feature of this dredge is that the hull is ventilated by four revolving ventilators. These keep a current of air passing which dries out the water that condenses on the inside of the hull, which helps to keep the timbers from rotting.

The pontoon line is of 3/16-in. Armco special steel pipe made by the American Rolling Mills Co. It is welded to the Koenig company's specifications which call for a strap to be welded over all seams after the seam is welded. This makes three welds instead of one, which adds a little to the cost. But since this specification was made there have been no split pipes. The pipes

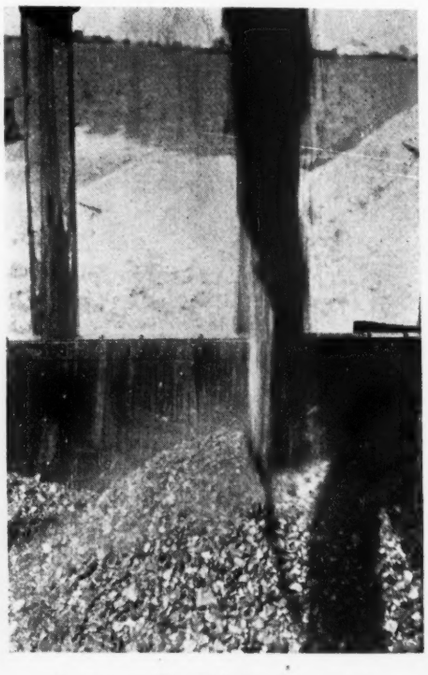


The booster pump on shore

are in joints of varying lengths which are butt-welded and the weld is protected by a strap welded over as on the seams. About every 30 ft. a flange of ⅜-in. metal is welded on and connections are made by bolts through the flanges except where the usual rubber connections and clamps are used to give the dredge a chance to swing.

The pontoons are timber frames on steel barrels, like gasoline drums. These have been found very satisfactory both from point of first cost and service. A framework on each pontoon supports the cables that bring in the current to the dredge.

It is a rule of this company that all persons wishing to pass between the dredge and



A stream like this loads a car in 2 1/2 minutes

shore shall go by boat. No one is allowed to walk the pipe line. The rule was made on account of a near-accident or two in which men slipped and grabbed the "hot" cable, fortunately doing themselves no damage.

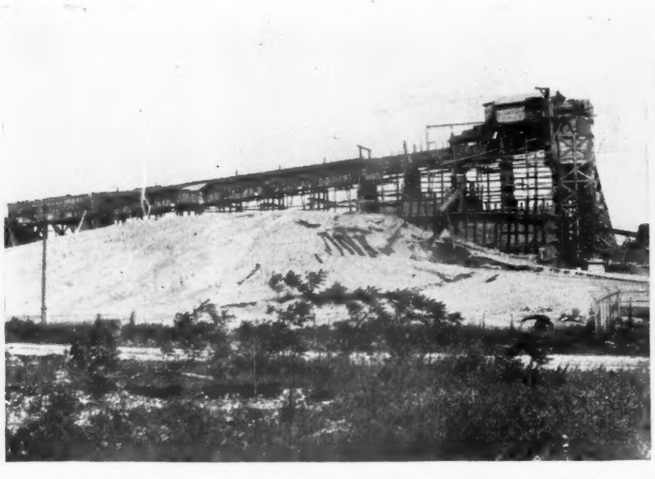
The pontoon line runs to a short shore line which leads to the suction of a booster pump. This booster is an exact duplicate of the dredge pump and the motor is a duplicate of the dredge motor. Both pumps "keep in step" so that the pipe line velocity is the same on both sides of the booster. The booster is housed in a small building on the shore.

From the booster the line runs up a long inclined trestle to the screens which are on the top of a tower about 75 ft. high. The line enters a wooden box on this tower about 12 ft. long. The box terminates in a curved portion of about 8 ft. radius which turns the flow at right angles and into the first screen.

This is a revolving screen 12 ft. long and 4 ft. in diameter. It is in two sections, the first with ⅝-in. holes, the second with 2-in. holes. What goes through the first section goes to the sand flume. What goes through the second goes on a gravity screen with ½-in. holes which takes out any sand remaining with the coarse. The oversize goes down a chute to a No. 8A Telsmith crusher. Thus three products are made two of which (gravel) go to bins and the third (sand) to the sand flume. The crushed oversize goes to the coarse gravel bin. Sprays in the gravel bins rinse the gravel.

G. E. Bentley (standing) and H. L. Aldrich

The sand flume is a sand recovery device peculiar to this district, in which it was invented. It consists of a long flume, perhaps 200 ft. in this case, sloping quite rapidly at first but of a flatter inclination at the lower end in which the fine sand is caught. Upright partitions are placed at intervals so that the water flows in a series of levels



Left—The screening tower and the sand flume. Right—Where the belt conveyor comes out from under the stockpile

like very long steps. Behind each of these partitions are valves to discharge the settled sand. Each consists of a nipple about an inch in diameter, which is closed or partly closed, as desired, by a swinging gate. The gates are worked by rods brought out to the side. There are a great many of these gates and three men are employed in attending to them, although one of these looks after the screens. Concrete sand is caught in the upity screen described and also for the sprays on top of the tower.

John F. Koenig is president and treasurer of the company, and Norman Koenig is secretary. The main office of the company is in Detroit. G. E. Bentley is superintendent and H. L. Aldrich is his assistant. Mr. Bentley has more than a local reputation as a sand and gravel engineer and does some consulting work in addition to

Under the loading bin. A man standing on the platform at the right shifts cars and controls the gates

per part of the flume and asphalt sand in the lower part.

The sand flume is over a long stock pile at the end of the gravel bins. Under this and under the gravel bins is a tunnel in which is a 36-in. belt conveyor that runs on an inclined trestle, after it leaves the tunnel, and on to the loading bins. The belt has 500-ft. centers and runs at 400 ft. per minute. It has "Brownhoist" rollers and head motion and gravity take-up.

The discharge of the conveyor is turned to fall on a gravity screen on which there is a heavy flow of water when gravel is being loaded. This gives the gravel a thorough rinsing and removes the last traces of sand. The gravel from this plant is exceptionally clean, as it should be after one washing and two rinsings. Sand is loaded without rinsing.

The car loading at this plant is arranged so that it can be done by one man who stands on a platform above the car. By pulling levers he can open any gate and by starting and stopping a Meade-Morrison car puller he can put the car in any position. The car puller is in a small house some distance away but the controls are on the platform. Ordinarily a car is loaded in 3 to 4 minutes, but a car has been loaded in 2½ minutes. An 8-in. Allis-Chalmers pump and 125-h.p. motor, direct-connected, furnish water for washing the gravel over the gravmanaging the plant. He was called to one of the large plants in the Tullytown, Penn., district as a consultant a short time ago.

"Rock Products in Automobile Tire Manufacture"

Editor Rock Products.

I THINK a great deal of Rock Products because you generally publish very excellent articles, but I wish to take exception to a short article on page 53 of the October 31 issue entitled, "Rock Products in Automobile Tire Manufacture." This was abstracted from an article in *Chemicals* for August 3, as shown by your footnote.

My particular complaint is that several of the statements in this are incorrect, and while that might be possible in such a publication as *Chemicals*, I think Rock Products should have caught the mistakes and corrected them. In the first column it is stated that diatomaceous earth comes to the trade bearing the name of tripoli. Tripoli, as known in the United States and as produced near Seneca, Mo., southern Illinois and Tennessee, is not and never was diatomaceous earth. Diatomaceous earth is noncrystalline and, of course, is the siliceous remains of aquatic plants and not animals. Tripoli is crystalline or rather micro-crystalline and rarely or never shows any trace of fossils.

In the next paragraph mention is made of asbestine. It should, of course, have been stated that this is a fibrous form of talc, and in the next paragraph it is stated that asbestine is closely allied to asbestos. Asbestine is a form of talc, while asbestos is an entirely different mineral.

Under barytes it is stated that this is merely a finely ground rock, which is misleading to say the least, as barytes is a definite mineral and the material used has to meet rather rigid specifications as to purity.

In the next paragraph it is stated that carbonate of magnesia comes from large deposits in eastern Pennsylvania. This is true in a way, but it should be stated that it is separated from dolomite and not leave the impression that it occurs naturally in this part of the country.

Under soapstone and mica it is stated that the best, purest and whitest comes from Ontario. This may be true as compared with most of the Vermont talcs, but the best domestic variety comes from California.

These comments may not be worth publishing, but I am simply writing to call the errors to your attention, as I know you wish any information published in Rock Products to be as nearly technically correct as possible.

W. M. Weigel,
Mineral Technologist,
Bureau of Mines, Department of Commerce.

Bureau of Standards Increases Its Operations

MANY improvements in the technique of industry with accompanying benefits to the general public are set forth in the annual report of the Bureau of Standards submitted to Secretary Hoover by Director George K. Burgess. Improved industrial practice, greater precision in commercial transactions, standard requirements for government purchases, and discoveries in the field of pure science, all mark the record of work accomplished by the Bureau of Standards during the year.

Dr. Burgess reports that during the year the bureau completed 171,196 tests, an increase of 26% over the preceding year.

Of particular interest to rock products producers, engineers and contractors were the studies made on the durability of concrete, weathering of building stone and properties of plaster.

Thirty-five simplified practice recommendations have now been accepted covering a great variety of commodities. Many more are in process of acceptance and surveys are in progress in many additional fields. The leaders in nine industries which have put simplified practice recommendations into effect estimate a saving of nearly $294,000,000 through this work.

Hints and Helps for Superintendents

Loading Mixed Sizes from Bins

IN crushed stone and sand and gravel plants it is often necessary to load a mixture of sizes and many ingenious methods of mixing have been worked out. One of the best is that in use at the plants of the Coast Rock and Gravel Co. of San Francisco, Calif., which was devised by A. D. Hadsel, the operating manager of the company.

Along the lower part of the bins runs a belt conveyor as close to the ground as is feasible. This is to have as little "dead" storage in the bin as possible. Short chutes lead from each bin to the belt and these come from gates that may be set for any desired opening. There are several gates on the market which will serve this purpose. From these gates either a single size or any mixture of sizes may be loaded by varying the openings of the gates.

The elevator goes up an incline to a small hopper or box by which it is fed to a swinging spout. This spout in swinging up and down throws the material from one side of the car to the other and if mixed sizes are being loaded this adds to the thoroughness of the mixing.

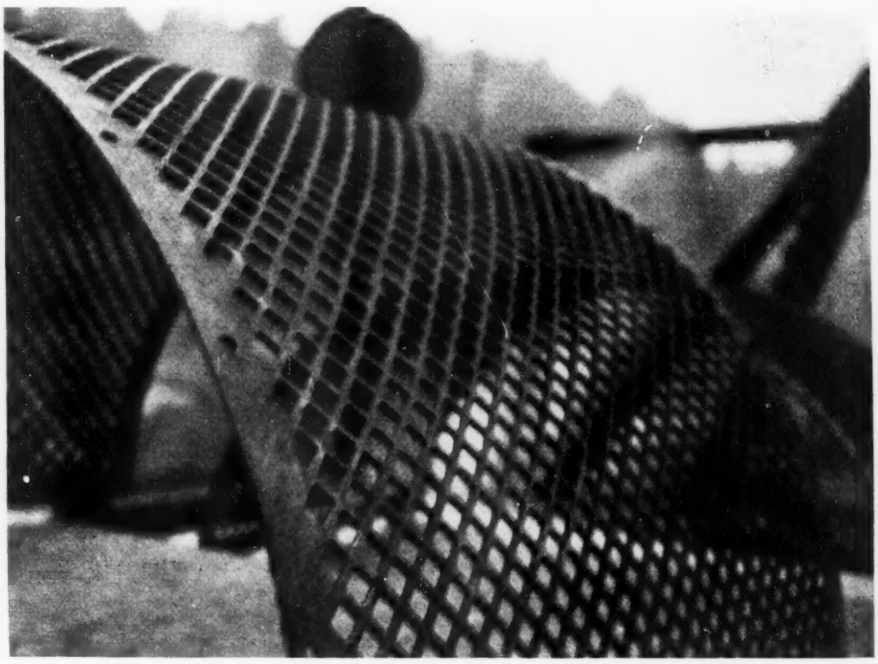
The swinging spout is moved by a simple link motion that is connected to the head pulley of the conveyor.

A Screen That Increased Production 15 Per Cent

THE screen shown in the picture accompanying this was developed by H. F Puariea, of the Willamette Gravel Co., Portland, Ore., and was punched to his order. It has not been placed on the market by any manufacturer so it properly belongs in the Hints and Helps section. Mr. Puariea has had a wide experience in screening both sand and gravel and crushed stone, and has found, as all operators have noted, that the difficulty most to be overcome in screening was that of "blinding," that is, the choking of the holes by pebbles or stones that wedged themselves into the holes and were not big enough to pass through.

He wished to have the greatest area of opening possible so he adopted the square hole, which gives 25% more opening, if the holes are punched on the same centers, than the round hole. He also preferred a punched plate screen as it has somewhat greater wearing qualities, although the area of opening is less than with a wire mesh screen.

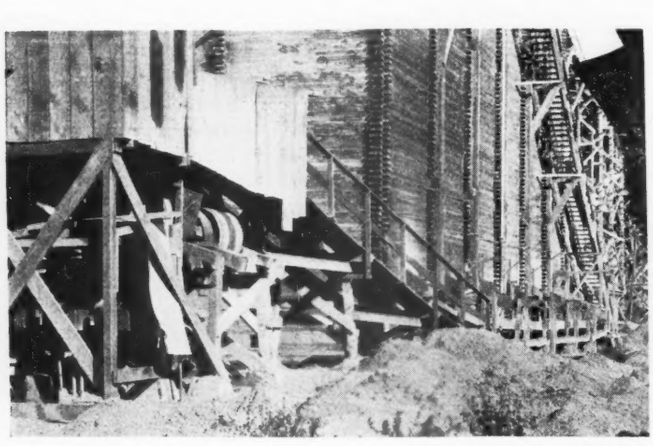
In experimenting with screens he was struck with the idea of turning the hole through 45 deg. This presented the longest diameter, the diagonal of the square, to the travel of the pebble as it rolled across the screen. He had a screen made in this way and found the screening was much improved.

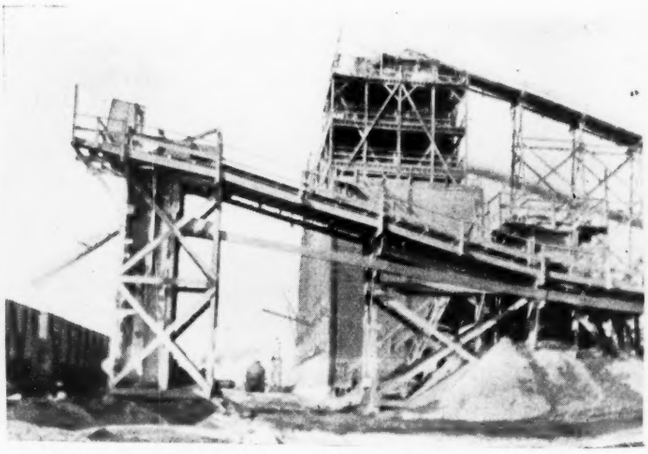


Turning the meshes so that the diagonal of the square is presented to the flow of material has resulted in 12 to 15% more efficiency

Actual tests on the full sized screen, made in regular daily runs, showed the efficiency of the new type of screen was from 12 to 15% better than the work of the old screen, both having the same sized holes punched through plate of the same thickness.

It is hard to give any good theoretical



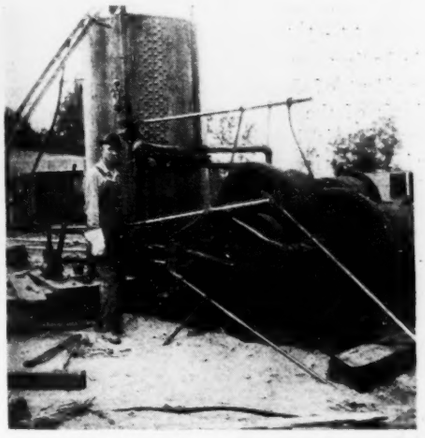


Left—The conveyor runs below gates which can be adjusted to make any mixture of sizes. Right—Mixed sizes are loaded by a swinging spout. Spout was moving when picture was taken.

reason for this improvement, but one feature of the screen that may help to explain it is the greater percentage of opening presented to a pebble rolling across the screen. If we consider a line drawn lengthwise of the screen through the diagonals of the square holes, it is easy to see that the width of opening presented in each hole is nearly 1.4 times the width presented in a hole turned square to the travel of the pebble. Hence the total of the open space along this line would be 1.4 times as much, and this might allow stones of a certain size and shape to go through which would otherwise stick in the holes. At any rate experience with the new type of screen has shown much less blinding and hence increased efficiency.

New Uses for Old Machinery

MACHINES which have outlived their usefulness in certain places may often find a use in other places, if a little thought is used. An example is shown in the picture of a hoist which is being set up to serve as a car puller. Originally this hoist was used to handle the suction and the swing lines of a dredge but the dredge was electrified and the hoist was thrown out of business.



Old steam hoist from a dredge set up to make a car puller

It was accordingly set on shore and later used as a car puller. Although electricity is available the cost of coal is so little for this kind of work that the difference in operating costs would take a long time to pay for a new machine.

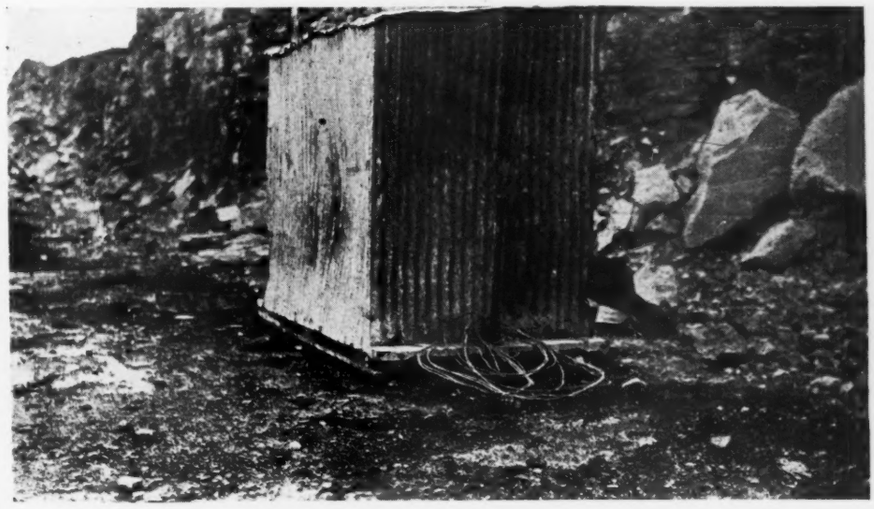
Shelter House Helps Keep Men Contented

MANY quarries, especially those producing flux stone for iron and steel furnaces, have to operate during the winter. The Carbon Limestone Co., Hillsville, Penn., is one of these.

F. O. Earnshaw, general manager, has found shelter shanties of the kind illustrated herewith very helpful in keeping the quarry laborers contented in winter and inclement weather at other times of the year.

As the view shows, the shanty is on skids or runners and is dragged behind the shovel by a cable. A shanty is provided for each shovel crew. These shanties are equipped with heating stoves and benches.

Mr. Earnshaw says: "The shanty is a very good inducement to the men to report for work regularly regardless of rain, snow, or sub-zero weather. They know that with this shanty a few feet behind the shovel there are always facilities for drying wet clothing, gloves, keeping their dinner buckets warm, etc."



A rough-looking shelter, but it means a lot to the men who have to work in the quarry in bad weather as they can dry clothes there and eat lunches in comfort

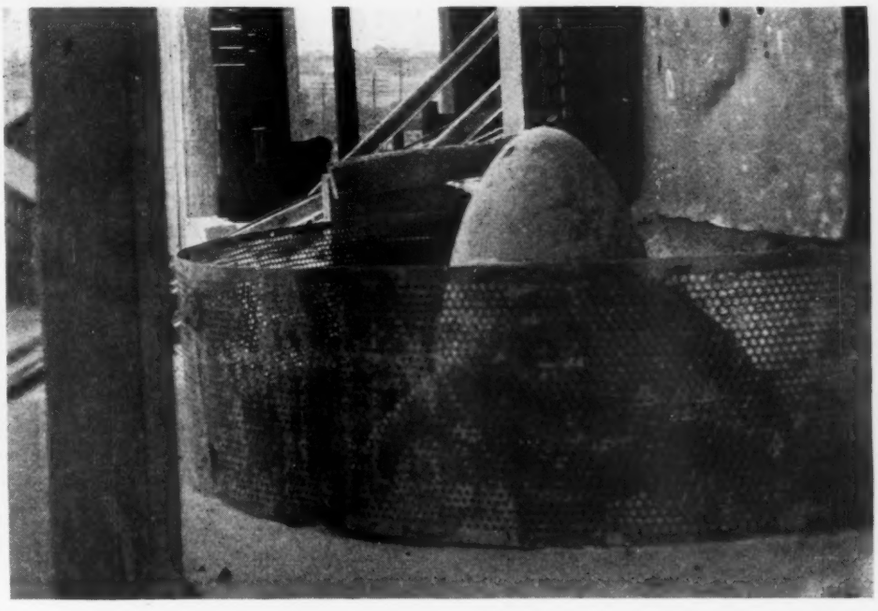
Old Screen Used as Crusher Guard

MANY uses for old screens have appeared in these "Hints and Helps" pages, enough probably to make a small book. The use of old screens to prevent damage from flying rock has been noted before, but the arrangement shown here is so neat and simple that it appears worthy of a place in the collection.

The picture tells the story completely. The screen sections are merely bent to a half circle and placed in front of the crusher. A fine screen is used so that there is no danger of pieces of any size going through.

Sheets of old corrugated iron and old flat screens are hung behind the crusher to keep flying rocks from going beyond the crusher room.

This picture was taken at the Sioux Falls plant of the Wisconsin Granite Co., Sioux Falls, S. D. The rock crushed is a hard quartzite and especial care has to be taken to protect the men from injury as the pieces have sharp edges.



A very neat crusher guard which is made of old screen sections bolted together

Pacific Coast Sand and Gravel Men Hold First Annual Convention

Adopt Resolutions Opposing Increased Freight Rate and Asking for Uniform Specifications

THE first annual convention of the Pacific Coast Sand and Gravel Association was held in San Francisco in the week of November 8-13 in connection with the Western Road Show. It was well attended and it is of interest to the sand and gravel industry as a whole on account of the important papers which were read and the resolutions which were passed. The address of T. R. Barrows, executive secretary of the National Sand and Gravel Association, to this convention was published in the November 14 issue of ROCK PRODUCTS.

The following resolutions were passed and show that the association is fully alive to the needs of the sand and gravel industry not only on the Pacific Coast but throughout the United States.

The office of the association is in Room 800, Hibernian Building, Los Angeles, Calif. E. Earl Glass is manager of the association. The association is affiliated with the National Sand and Gravel Association.

Resolutions

I—BE IT RESOLVED, that this Convention views with alarm the request of the western railroads for an increase of 7½c per ton in freight rates on rock, sand and gravel; first, because, in many cases, it is an increase of from 10 to 15%, which is a much higher percentage than is being asked on other commodities; secondly, that this increase will defeat its own object, namely, increased revenue to the railroads by diminishing the tonnage of rock, sand and gravel, which they will handle, diverting much of this tonnage to plants which are shipping by water or motor truck.

II—BE IT RESOLVED, that it is the sense of this Convention that all producers of rock, sand and gravel should watch very carefully the financial responsibilities of their customers or prospective customers, and should not sell their product, relying on the surety company for payment.

III—BE IT RESOLVED, that it is the sense of this Convention that producers of rock, sand and gravel should immediately co-operate with architects and engineers, city, county and state officials, to the end that uniform standard specifications for rock, sand and gravel be adopted, which specifications shall be fair and reasonable to all parties concerned. To insure maintaining these specifications, this Convention favors the proper instruction of inspectors and, wherever possible, that material be inspected at the point of production.

IV—BE IT RESOLVED, that this Association is unanimously in favor of selling sand, rock and gravel by the ton of 2000 lb. as the only fair and equitable method of measurement.

V—BE IT RESOLVED, that this Convention favors the continuance of federal aid through the agency of the Western Road Association, which has just been organized for that purpose.

VI—BE IT RESOLVED, that this Convention recommends to the manufacturers and distributors of rock crushing, screening and washing equipment, that they do not finance the construction of new rock, sand and gravel plants.

VII—BE IT RESOLVED, that this Convention tenders its most hearty thanks to the *Western Highway Builder*, a well edited California magazine, for conceiving and carrying out the thought which has resulted in this "All-Western Road Show," and the opportunity for this excellent Convention.

Dredging Sand and Gravel in the Ohio River

A. W. Williams, Louisville, Ky.

MUCH litigation has resulted along the Ohio river over the past few years from the methods used by the sand and gravel companies in pumping, or digging sand and gravel from the bottom of the river, loading it to barges, and transferring it to yards at Louisville. There hasn't been any pit sand to mention in this market for years, and at best the pit companies were hand operated concerns. There has been so much litigation over river rights that eventually someone will compile a volume regarding sand cases, which would prove interesting, and also useful.

Under existing laws, Kentucky has jurisdiction over the Ohio river, or northern boundary, which is in reality the low water mark on the Indiana shore. Should the river cut a new channel overnight, the farmer on the Kentucky side might have a half-mile added to his property, which would be in Kentucky, and the Indiana farmer might have a river running right through his farm. The bottom of the river is technically and legally the property of the owner of the Kentucky shore line, opposite any given section of river bottom, and extending to the low water mark on the Indiana shore line.

The Kentucky sand companies don't worry with buying shore property and paying a lot of taxes and digging sand opposite their own property. They go to the property owners, and agree to pay them so much a barge load for all the sand or gravel removed. A big pumper or dredger loads a lot of material in a day, and any given piece of shore line won't keep a pumper busy very long, moving up and down the stream and digging out the channel as deep as 40 ft. at places, where especially good sand is available. The river shortly fills up the old digging holes, however.

Of course with the steady removal of material there has to be replacement from banks, islands, etc., above, and every now and then a suit is filed, charging one or another of the sand companies with taking sand to which they had no right. Over the past few years there has been an especially large number of suits filed by Indiana people, who secured lawyers with no knowledge of the existing state boundary laws. In all of these suits the Indiana shore line owners have lost out, but it has put the Kentucky owners to a considerable amount of expense and trouble in fighting.

It has been advocated that the sand and gravel companies co-operate and put the various cases in book form, and when such cases come up, that they present the lawyer and plaintiff with a copy before the suit is filed, or immediately thereafter, if no information is available regarding possibility of filing suit.

In some cases an island has been sold. That island is property in Kentucky, not in Indiana, even if it should be owned by a resident of Indiana, living on the Indiana bank of the river. In such a case another question is involved as to where property right to river bottom starts and stops, as between island owner, and Kentucky bank owner.

The sand and gravel companies which hasn't a few of these sort of cases in the courts can't be an exceptionally big or busy concern, or it would be getting itself into more trouble in its operations up and down the river.

Technology of Gypsum Products

A CIRCULAR on the manufacture of gypsum products will shortly be issued by the Bureau of Standards. This is the result of visiting 25 of the important plants of the United States and a description of these plants is given in an appendix to the circular.

The object of the field work was to obtain complete information about the process of manufacture of calcined gypsum and gypsum products; to study the methods of mining, or quarrying, and crushing; to select typical samples of the raw material for analysis; to observe the methods of calcination, temperatures, and duration of calcination; to study the methods of sampling the calcined product; to follow this through the process of grinding, screening, and packing; and, finally, to observe the methods of manufacture of products made from calcined gypsum. The equipment employed and the processes used are correlated and compared.

The circular will be obtainable in the near future from the Government Printing Office.

Weighing vs. Measuring Aggregate for Concrete*

The Advantages of Weighing with a New Rule for Designing Concrete Mixtures by Weight

By E. Earl Glass
Manager of the Pacific Coast Sand and Gravel Association

THE rock, gravel and sand industry of today has outgrown some of the methods of past years and the producers are endeavoring to keep their methods, service and materials abreast of the engineering progress of our day. Being an engineer, I can point out the need for engineers to assist or take the lead in accomplishing some needed reforms. It is high time that the measurement of a material with sales amounting to millions of dollars should be better than a very rough approximation. This is all that may be said for the cubic yard as a unit of measurement for sand, rock and gravel. The rock products men hereby issue an invitation to the engineers and constructors to join in relegating the ancient custom to the discard.

To determine the degree of accuracy or inaccuracy of this method, one of our producers invited engineers from the three leading testing laboratories of Los Angeles to come separately and measure some truck loads. Taking the trucks as they came and exercising greater care than is practicable ordinarily, the results proved that guess-estimating may be done by experts within 17%.

Experts Guess Weight Within 17%

The following letter is enlightening:

"In accordance with your request that we stop in at one of your yards and check the weights of your shipments, beg to report that on April 3, 1925, a representative of the Industrial Testing Laboratory, stopped at your 16th street bunkers, and checked three (3) shipments.

"All three trucks were loaded with similar material drawn from the same bin and loaded by the same operator.

"From visual inspection the loads appeared approximately the same. In checking the actual weights the results were as follows:

Truck Number	Tare Weight	Gross Weight	Net Weight
18	8600 lbs.	19600 lbs.	11000 lbs.
2	9000 lbs.	20600 lbs.	11600 lbs.
63	10300 lbs.	23200 lbs.	12900 lbs.

Respectfuly submitted,
INDUSTRIAL TESTING LABORATORY,
By CHARLES S. HOWE.

Until the producers of Southern California formed their association and declared the ton should be the unit of measurement for their products, this was the method used for measuring out all sand, rock and gravel for building construction in this territory The wonder is that such laxity was tolerated so long, especially since the contractor was losing as much as the material man.

Road builders in certain states have estimated their rock materials by weight and have bought them by weight until they recognize no other unit for measurement of the materials going into either asphalt or concrete roads and streets.

E. Earl Glass

Why the building constructors have been so slow to adopt the only practical unit for measurement of these materials is difficult to explain. It is quite apparent that the bulk of any load would vary with the length of bumpy haul it had been subjected to and the bulking effect of wet sand. The nearest approach to a quick and accurate measurement is that provided by weighing the load and issuing a certified weight ticket with each load.

Regarding sand delivered so wet that water is still running from the load, it is evident that some weight has been lost since weighing but this loss is negligible compared with the accompanying loss to the buyer from bulking.

Getting down to basic reasoning—let us consider a block of that material from which the sand, stone and gravel men have carved out their varied careers. In southern California, we deal principally with a good grade of granite, usually in the form of stream gravel and boulders. We will take a block of granite 1 ft. on each side and see what happens to it when the rock man gets it.

The geologist tells us that granite has a specific gravity of 2.65 which means that it weighs that many times as much as an equal volume of water or 165 lb. per cu. ft.

When the run our 1 cu. ft. block of granite through the crusher it is broken into many irregular pieces so it occupies considerably more space than the solid piece. If we gather the pieces we may find that they fill a box having a capacity of 1.66 cu. ft. We know that the difference is due to voids or the air space between the uneven faces.

Voids in Broken Rock

Thus the solid block has swelled in crushing to two-thirds more than its orginal volume and now has 40% voids and weighs 100 lb. per cu. ft. If it has broken so that there is a good grading of all sizes from small to large pieces, the small fragments will tend to fill the space between the larger bits and the voids will be materially reduced. On the other hand, if the broken stone is quite uniformly of one size, whether large or small, the voids will be greater and the weight of the cubic foot sample considerably less than before. In this way it is possible to have as wide a range of voids as 25% to 55%.

The use of sand, broken stone or gravel in construction requires that it be well graded in sizes of fragments and therefore it is safe to assume that the granite sample will average 40% of voids for both fine and coarse aggregate.

If we had carried our block of granite through the rolls and ground it down to sand sizes we would find that the addition of water to the fine material would produce a vastly different effect. With each pound

*Paper delivered at the San Francisco meeting of the Pacific Coast Sand and Gravel Association.

of water added to the dry sand, a swelling action takes place which reaches a maximum at about 6% when it is found to have increased several times the bulk of the added water.

This action is simply explained. Each small particle of stone becomes coated with a film of water which is of quite appreciable thickness when compared with the diameter of the sand grain. The effect upon the whole sample of this separation of the sand grains is apparent from the following diagram taken from an article by Arthur A. Levison, former highway engineer of the United States Bureau of Public Roads. Quoting from Mr. Levison's article:

"When dry sand is moistened by mixing with a moderate amount of water, the volume of the sand is increased out of all proportion to the amount of water added. Stated otherwise, dry sand weighs more per cubic foot than moist sand. While this bulking or swelling phenomnon was recognized and investigated more than 30 years ago, the direct effect of it on the measurement of fine aggregates for concrete has attracted attention only recently. The Iowa State Highway Commission, for example, experimented in 1923 with the weighing of aggregates for concrete road construction and, as a result of the experiment, has adopted the practice of weighing as standard procedure. One of the advantages claimed for the weighing method is that the effect of moisture on the volume of fine aggregates can be disregarded, the only correction necessary being that for the weight of contained water.

"Experiments made recently by the United States Bureau of Public Roads show that the extent to which a given sand will bulk is dependent principally upon its nature and gradation, the manipulation and the amount of moisture present. In general, fine sands bulk more than coarse sands. It is apparent that volumetric measurements of concrete sands under certain moisture conditions will give approximately 20% less of actual sand than the same volumes of the sand when measured in a dry condition."

By referring to the diagram it will be seen that the loss of excess water may actually increase the bulk of sand so the volumetric method is still more in error. Take the coarse sand, giving the lower curve for instance. If it were sent out from the plant with 10% by weight of moisture, which would be an extreme case, it might lose 4% of weight before use, in which condition it would occupy 10% more of volume than when weighed. This proves that the weight is the more stable unit under any conditions and for all concerned.

Settlement of Bulked Sands During Shipment

It is quite apparent that this bulking effect is more apt to render measurement erratic than the settlement in shipment. It has been proven by careful tests that sand and stone or gravel will compact as much as 10% after a short haul in wagons or trucks and about the same amount after rail shipment. This settlement or reduction of voids in transit has often upset the calculations of those endeavoring to check the volume of delivered materials against the weight of the load, because the ratio of weight to volume is ever changing. On the whole, there is little that may be said for the volumetric method of measuring aggregate except that it was about the last of the fallacies to fall before the facts of better concrete.

The proper factor to use in converting tons of aggregate to cubic yards and vice versa has been difficult to determine because of the many variables entering into the use of the volumetric unit. This problem has been answered by the testing engineer, specifying that uniform volumes shall be obtained by "dry rodding." This is done by placing dry aggregate in three equal layers in a cylindrical measure having a height equal to its diameter, each layer being

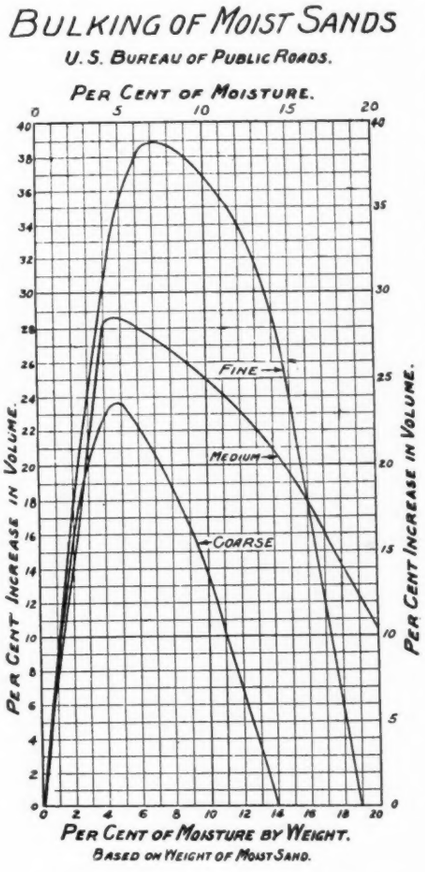


Diagram showing how bulking varies with moisture content

worked 30 times with a pointed ⅝-in. metal rod, any excess aggregate being struck off when the measure is full. In no other way can a volumetric measurement be more than an approximation for these materials. As field conditions require use of damp sand and loose measurement of materials, this method is limited to the laboratory.

Of course the concrete engineer will endeavor to learn enough about the material to be used on any important structure or project to determine the proportions which will give the most dense and therefore strongest concrete. It is noticeable that the ratio is seldom that which years of popular usage established as 1:2:4, 1:3:5, etc. His corrections for moisture content and bulking will accomplish little good for the work in hand unless the corrections are determined and applied throughout the construction. What follows is not intended for the guidance of engineers but only to assist the contractor in estimating the materials required for any specified mix, using weight measurements. It must be remembered that the output of any particular quarry or pit and sometimes an entire district may be quite uniform, the variation in weight of different samples and sizes being entirely due to variation in voids, as we have shown.

Measurement methods have ranged all the way from the not uncommon practice of "a shovel of sand and two of rock" to the inundation method by which the actual voids are determined and the mix adjusted as the work progresses. Intermediate between these is the wheelbarrow load which is sometimes struck off but more frequently heaped; the rectangular measuring box for hand mixing and more recently, the batch box which is a refinement in a method of measuring aggregate that still fails to get away from the irregularities of the volumetric measurements.

It has been repeatedly demonstrated that variation in weights of as much as 20% is found in apparently similar struck batches because of inappreciable changes in grading of the material and consequently the voids. Engineers agree that the further improvement of weight batching as now practiced by some state highway departments will soon give way to the inundation method which is both practical and scientifically correct.

The experiments conducted by the Lewis Institute laboratory and others during the past five years, have completely revolutionized the theory and practice of concrete mixtures and the engineers are now obtaining concrete which tests several times stronger than the old "sloppy mixes." The aim of all these developments is a more uniformly good concrete which will be reflected in better construction and untold benefit to the public and the building industry.

Rule for Mixing by Weight

Since the adoption of the ton unit for measuring sand, rock and gravel in southern California, there has been an urgent need for a ready means of estimating the quantities of these materials required for any given mix of concrete. About ten years ago the writer devised a variations of Fuller's concrete materials formula which gave results closely approximating these furnished by Taylor & Thompson's tables. This was widely published at the time and formed the basis for an attempt to answer the problem presented here.

It is well known that there is considerable range in the assumption that a sack of cement is equal to 1 cu. ft. The degree of compacting to which this material is susceptible makes it reasonable to assume for our purpose that a cubic foot of cement weighs 100 lb. The same weight is a very

COMPARISON OF STRAIGHT LINE FORMULA WITH TAYLOR & THOMPSON TABLES FOR MATERIALS REQUIRED FOR VARIOUS MIXTURES OF CONCRETE

Concrete Mix	Quantities per cu. yd. of concrete: Cement bbl.	Sand cu. yd.	Stone cu. yd.	Sum of parts		Quantities per cu. ft. of concrete: Cement lb.	Sand lb.	Stone lb.
1:1:2	2.52	.37	.75	4	T & T	35.2	37	75
					S-L-F	36.2	36	72
1:1:3	2.03	.30	.90	5	"	28.5	30	90
						29.0	29	87
1:1½:3	1.83	.41	.81	5½	"	25.5	41	81
						26.3	40	79
1:2:3	1.67	.50	.74	6	"	23.3	50	74
						24.2	49	73
1:2:3½	1.54	.46	.80	6½	"	21.6	46	80
						22.3	45	78
1:2:4	1.44	.43	.85	7	"	20.2	43	85
						20.7	42	83
1:2:4½	1.34	.40	.89	7½	"	18.8	40	89
						19.3	39	87
1:2:5	1.26	.37	.93	8	"	17.6	37	93
						18.1	36	91
1:3:5	1.11	.49	.82	9	"	15.5	49	82
						16.1	48	81
1:4:6	.91	.54	.81	11	"	12.8	54	81
						13.2	53	80
1:4:10	.67	.40	.99	15	"	9.4	40	99
						9.6	39	97

good average for the weight of ordinary concrete aggregate, both fine and coarse.

With this ready assumption, we have the three ingredients of plain concrete reduced to an equal weight basis and any mix may be worked out by simple proportions.

Since the average weight of plain concrete is 145 lb., the material required for any job may be determined closely by finding the number of cubic feet of each kind or mixture of concrete and using this straight line formula. By merely assuming that all material are of approximately the same weight, the pounds of cement in each cubic foot of concrete will be the weight of 1 cu. ft. of concrete or 145 lb. divided by the sum of the parts in the mix. This weight times the parts of sand will give the weight of sand per cubic foot of concrete and the weight of stone is obtained by multiplying by the number of parts of stone. It is even simpler than it sounds and sufficiently accurate to take its place beside the older formulae and tables.

One real advantage of this rule is that it will give the approximate weight of materials required for the odd proportions encountered where the mix is fixed by screening tests and the "fineness modulus."

Rule Will Make Weight Unit Popular

This rule which is really too simple to call a formula, is offered to the contractors with the recommendation that it is as accurate as the estimating methods they have used heretofore and should make the ton unit more popular with some who have been puzzling over conversion factors and other devious means of applying the new weight units to the old box measures.

The first columns above show the quantities of materials for 1 cu. yd. of rammed concrete, as given in Taylor and Thompson's tables, based on a barrel of 4 cu. ft. and 40% voids in broken stone or gravel.

The straight-line formula is based upon the assumption that all concrete materials are of approximately the same weight and therefore will be fairly approximated by direct proportion. Thus for a 1:2:4 mix, the sum of the parts being 7, the weight of cement will be 1/7 of the weight of the total concrete, the sand 2/7 and the stone 4/7. As plain concrete weighs 145 lb. per cu. ft., these readily reduce to approximately 21 lb. of cement, 42 lb. sand and 83 lb. of stone per cu. ft. of rammed concrete.

The last three columns show the remarkable degree of agreement between the two estimating methods. It will be seen that the differences between the two fall well within the range of accuracy to be expected of such tables or formulae. One hundred pounds per cubic foot has been used here for all three materials.

How Shall We Charge Development Work?

EDITOR ROCK PRODUCTS: Your editorial in the issue of November 14 captioned "A Generally Unappreciated Asset" touches a very vital phase of open-pit mining operation and one which has probably been the subject of more abstract discussion than any other connected with accounting in rock products industries.

The cost of development work may be charged to any one of three accounts; namely, capital, deferred expense, and direct or current expense.

It would be manifestly unfair, if not improper, to charge cost of development, the benefits from which would accrue to the business over a period of years, to current expense for any one year; but, if the development is of such nature that the benefits would accrue to the business during the same year in which the work is done, then in my opinion it should be charged to current expense.

Assuming that benefits from the development will accrue over a period of years, then the manner of setting it up in accounts would depend largely, I think, upon particular circumstances or conditions. For example, should the cost of such work be paid from profits earned or to be earned, it might well be charged to deferred expense, in which event, at the close of each succeeding year, or monthly if preferred, an amount approximating benefits accrued, would be transferred from deferred to current expense.

If, however, money raised for capital expenditures should be used for development, then the cost of such development should be considered as investment of capital and so handled in the accounts, whether it be original capital or new capital.

I expect you have considered this subject from the various viewpoints I mention and am not writing you in the hope of adding anything to your knowledge of it, but it happens to be a subject that interests me and I was glad to see you touch upon it editorially.

BEN STONE,
Manager, Merom Gravel Co.,
Indianapolis, Ind.

Buying Power of Wages Increasing

THOUGH the high wages paid at the peak in 1920 are looked back upon regretfully by many workers, yet the buying power of their earnings during the last three years has been considerably greater than the buying power of those very high figures of 1920.

This fact is revealed by a study of wages over the period from 1919 to the middle of this year made by the Metropolitan Life Insurance Company. The real wages are determined in the study by finding the ratio between money wages and the index of living costs. This index took a sharp upward turn in 1919 and continued to a peak in the summer of 1920. Living costs receded from then until the beginning of 1922. Money wages receded also but recovered late in 1921 and rose steadily until well into 1923. Even the sharp downward drop of wages in the summer of 1924 brought the factory workers' buying power only to the level of peak times in 1920 and the autumn of last year and the spring of this year showed a rebound.—*National Bulletin.*

Cavein at Gysum Mine Results in Fatalities

ONE man was killed instantly and another probably fatally injured when they were buried by a recent cave-in in a tunnel of the gypsum mines of the Beaver Products Co. at Akron, N. Y. Their bodies were not recovered until late the night of the accident by employes at the mine. Peter Fedchanda of Akron is the dead man. Joseph Mart of Akron, is in the Millard Fillmore hospital suffering from internal injuries. Both men were employed at the mines as laborers.

Medical Examiner Charles E. Long was called to investigate the accident. He said that the two men were working alone in the tunnel when part of the roof gave way. Fedchanda was buried beneath tons of dirt and suffered a broken back and other internal injuries. Mart, who was working nearby was only partially buried by the slide. His head remained above the top of the dirt.—*Gloversville (N. Y.) Herald.*

Standardization of Specifications for Sand, Rock and Gravel*

California Highway Engineers Adopt Standardized Grading

By C. L. McKesson
Materials and Research Engineer for the California Highway Commission

SAND and gravel producers are always asking why engineers have so many varying specifications for coarse and fine aggregate. The question may well be answered Yankee fashion by another question, why so many brands of coffee, so many makes of automobiles, or why not a single church? Differences of opinion are a healthful indication of mental activity.

The design of cement concrete and bituminous concrete mixtures has been the subject of intensive study and experimentation during the last decade. Independent investigators in many sections of the country have been working under widely varying conditions. As a result, a number of new theories for the design of these mixtures have been evolved and it must be said that most of them have some merit. Old theories have also been developed. The net result is that concretes produced are much stronger than those produced ten or fifteen years ago.

Each school of concrete design has some peculiar theory upon which it rests its claim for superiority and to ask these believers in the various theories to come together and agree upon the details of concrete design would be just as futile to attempt to secure an international conference to decide upon a standard breakfast food. For that matter, let us turn to the producer and see how easy it would be to get them to agree on a standard product for all work. Producers in belts where there is an abundance of hard, tough igneous ledge rock are in accord in the claim that such material is superior for concrete and for bituminous work. On the other hand, producers in localities where sandstones and softer gravels prevail, point to good work produced with their materials and are ready to oppose any tests or restrictions which will limit their field for sales.

What Can Be Standardized

Being thus confronted by differences of opinion among engineers as to the relative suitability of various materials and equally insurmountable difference of opinion among the producers, the first step in standardization of specifications must apparently come by finding out what features are common to all theories of design. Such features can then be standardized as to expression. Other requirements can never be standardized because they rest upon fundamental differences of theory or upon local differences in material conditions or structural requirements.

The study of materials and preparation of specifications is of necessity a regional problem.

There can never be a single standard specification for concrete aggregate for any large section of the country. Rock and sand are very heavy and transportation costs are high. Each producer's territory for distribution is therefore necessarily limited by transportation costs. The quality of material differs in the various localities, and any economical design of either cement or bituminous concrete must be founded on careful consideration of relative suitability of local materials.

It may be found, for instance, that all local materials are somewhat weaker structurally than would be considered ideal. In most work it is possible to compensate for such weakness by the use of a richer mixture or by other variations in design. On the other hand, the cost of importing high-class material from another locality might be found to be very expensive. Sound engineering practice would require a comparison of costs of work with local material including additional cost to compensate for weakness, against outside material including extra transportation costs.

The California Highway Commission, recognizing the economy of using local materials where possible makes it a standard practice to prepare a materials report for each job before the specifications are printed. Modifications can thus be made in the standard specifications when desirable to permit the use of local materials.

Standardization of general specification requirements is, however, entirely feasible if carried out through the cooperation of producers and users in each locality.

Much has been accomplished during the present year along this line by the engineers and producers of Southern California.

Prompted by the desire to render service to the public, the Los Angeles chapter of the American Association of Engineers, last spring, called a conference of engineers representing the larger local users of sand, gravel and crushed rock.

The conference was convened April 15 with Mr. F. H. Joyner, consulting highway engineer for the Los Angeles county road department as chairman and with the following membership: J. L. McBride, chief engineer, Orange County Road Dept.; Paul E. Kressly, consulting engineer; Edward M. Lynch, consulting engineer; J. J. Backus, chief inspector of buildings, City of Los Angeles; C. L. McKesson, materials and research engineer, California Highway Commission; R. H. Rook, chief inspector of public works, Los Angeles; E. Earl Glass, executive secretary, Associated General Contractors, Southern California Chapter; J. E. Jellick, district engineer, Portland Cement Association; Raymond G. Osborne, Raymond G. Osborne Testing Laboratories; E. O. Slater, manager, Smith-Emery Company; T. A. Fitch, testing engineer, City of Los Angeles.

Several meetings were held and it was found that, while several different theories of the design of concrete were adhered to by the various members, it was readily possible to agree on a standardized grading for concrete sand. A standard specification for concrete sand was unanimously adopted. This standard specification may be summarized as follows:

Standard Specification for Sand

Sand shall be free from oil and organic matter. It shall be washed and shall show a strength equal to Ottawa sand when made into 1:2 mortar and tested at 7 days. The grading to be within the following limits:

Passing a ⅜-in. sieve	100%
Passing a No. 3 sieve, not less than	95%
Passing a No. 4 sieve	85%- 95%
Passing a 30 mesh sieve	15%- 35%
Passing a 100 mesh sieve, including silt, clay, not more than	5%

The character of the local deposits of sand and gravel in Southern California render it easy and economical for producers to produce material complying these requirements. The same specification could be adopted in the Bay Region, in the Fresno and the Sacramento sections.

In the matter of standardization of specifications for rock and gravel, this joint committee encountered some difficulties. Concrete is used for many purposes and

*Paper presented at the first annual convention of the Pacific Coast Sand and Gravel Association, held in connection with the All-Western Road Show, November 13, 1925.

maximum sizes must of necessity vary with the use for which material is intended. After considerable discussion, the joint conference found it practicable to adopt a standard grading for coarse aggregate for use in concrete pavements or base over 6 in. in thickness. The following is the approved grading:

Grading for Gravel

Passing sieve having 3½-in. openings	100%
Passing sieve having 2½-in. openings	90%-100%
Passing sieve having 1½-in. openings	60%- 80%
Passing sieve having ¾-in. openings	30%- 50%
Passing a No. 3 sieve	0%- 5%

A standard grading was also adopted for use in concrete pavement less than 6 in. thickness in curbs, walks and gutters. The grading to be as follows:

Passing sieve having 1½-in. circular openings	100% by weight
Passing sieve having ¾-in. circular openings	30%-65% by weight
Passing a No. 3 sieve	0%-5% by weight

It is apparent that other sizes of aggregate would be required for other purposes and it was believed to be desirable to make a schedule of standard plant bin sizes from which any desired grading can be made.

This, in the end must be the solution of the matter of grading by gravel and rock from the producer's standpoint. If the engineers will agree upon bin sizes which can be combined from required gradings, the producer by keeping material segregated in such sizes, will be in a position to make any specified grading.

Standardization of Screened Sizes

The following bin sizes were agreed upon:

Class	Pass	Retained
0	3½-in. circular opening	2½-in. circular opening
1	2½-in. circular opening	1½-in. circular opening
2	1½-in. circular opening	¾-in. circular opening
3	¾-in. circular opening	No. 3 sieve, not more than 25% to pass a ½-in. circular opening.

A number of the users represented in the conference took immediate steps to make such changes in their specifications as were necessary to enable producers to make up specification materials from the four bins listed above.

The California Highway Commission, for example, had for many years been using coarse aggregate for bridge work with a maximum size of 1¼ in. They immediately changed this limit to 1½ in. so that material for this work could be made by blending sizes 2 and 3.

This method of standardizing bin sizes is apparently the only solution of the difficulty of variations in specification gradings. With standardized bins, any specification grading which begins at the maximum size in any bin can be made by drawing from one or more bins.

With this system in operation, it will be incumbent upon the producer to employ a skilled man at each plant to make up various specification gradings by determining the amount required for each bin. He must also have authority to see that the mixture is actually made up in the proper proportions and not by the method sometimes practiced, that of taking the most material from the bin that is filling fastest. The regulation of mixes cannot be handled by uneducated Mexican laborers.

Mechanical equipment at the plant should be such as to insure uniform blending. This is accomplished in many well constructed modern plants by discharging from the several bins to a belt conveyor thence to the car or truck for delivery.

Standardization of tests for soundness and quality of coarse aggregate is not yet possible. Considerable research work is under way by various engineering agencies and it is hoped that tests may presently be developed which will give a true measure of the service value of material and that these can be agreed upon as standard tests. It is not to be expected that these test requirements will be uniform for different sections for reasons which I will attempt to outline, but the tests can at least be standardized in time.

The quality of the aggregate, that is hardness, toughness, shape of particles, etc., does actually affect the strength of cement concrete. In weak concretes (say 2500 lb. per sq. in.) almost any coarse aggregate is harder and tougher than the mortar and this consideration of quality is of minor importance. As the strength of the concrete is increased by the reduction of mixing water, by improved grading or by addition of cement the quality of the coarse aggregates becomes a factor of increasing importance. As this quality requirement must be more rigid in high strength concretes, it must not be expected that any single standard of hardness or toughness will ever be acceptable for all grades of work.

The quality, as well as the voidage, in sand very appreciably affects the strength of concrete, other considerations remaining constant. We have shown by tests that variations in quality of material, all of which is well within our present state highway specifications, may affect the strength of concrete by six hundred or more pounds per square inch.

In order to counteract a possible feeling on the part of some producers that the modern rigid regulation of materials is useless and theoretical rather than practical, I would point out that these rigid controls have increased the strength of concrete used in California state highway work until 4000 to 5000 lb. per sq. in. strength are the rule and not the exception. Before these practices were introduced, the same amount of cement was used with strengths usually between 2000 and 2500 lb.

Again to illustrate how variations in quality of materials can affect concrete strengths, I would cite a series of tests made last year.

Identical samples of ten brands of cement were made up in concrete in three laboratories, each using standard concrete aggregates locally available. The Bureau of Public Roads laboratory in Washington, D. C., used Potomac River sand and gravel. The Washington State Highway Department Laboratory used sand and gravel produced near Olympia and the California Highway Commission used sand produced in this section and which is typical of the better quality of material produced in this state. The grading, amount of cement, consistency and methods, making, curing and testing were all A. S. T. M. Standard and uniform. The following differences in average results may reasonably be attributed to difference in quality of sand and gravel.

Laboratory	Average strength, lbs. per sq. in.
U. S. Bureau of Public Roads	3691
California Highway Commission	4706
State of Washington	5648

Each result is an average of a large number of specimens.

Now, while it is very apparent that quality of aggregate is an important consideration in that it greatly affects the strength of first-class concrete, this example also suggests the impossibility of a single standard for different sections of the country. A test which would describe the Washington state material would bar Potomac River material and might entail absurd expense in an attempt to secure material which would be acceptable. The very high strengths obtained with Washington state materials could probably be obtained in Washington, D. C., with less expense by using more cement rather than by shipping materials long distances. The design is some cases might be modified by increasing thickness to permit of the use of weaker concrete.

Similar considerations are involved in selecting materials for bituminous concrete. Some materials are vastly better suited to this work than others and again local standards should be fixed in each locality.

Producers are urged to recognize the fact that materials are not like men "all created equal." They should not too bitterly resent the rejection of their material for some specific use basing their argument on its use with fair results by some other engineer. It is better to find out just what uses the material is best suited for and to press sales in that field. Engineers on the other hand, should not allow prejudice or unsupported opinion to lead to rejection of material. A given material may be of little value for one purpose, but entirely suitable for another.

The movement started in Los Angeles by the engineers in getting together and agreeing on as many specification points as possible, is a step in the right direction, but it will not be productive of results without intelligent and effective cooperation by the producers.

Universal quality standards are not practical or economical, but local specification standards are entirely feasible and should be worked out in each community by the engineers with the encouragement and cooperation of the producers.

A High Strength Gypsum Plaster*

By Working with Water at a Temperature Too High for Setting, a Product Resembling Marble Is Said to Be Obtained

By M. L. Chassevent
Translated for Rock Products

WE have discussed in a previous article (see *Comptes rendues,* volume 178, year 1924, page 1543) the speed of crystallization of a saturated solution of $CaSO_4,\frac{1}{2}H_2O$ at a temperature of 16 deg. C., the crystallization taking place either alone or in the presence of seed crystals of $CaSO_4,2H_2O$. This study was carried out with the aid of apparatus which determined the electric conductivity of the solutions at various temperatures between 16 and 80 deg. C. The results were shown in graphic forms in curves which indicated the concentration of the solution in grams of calcium sulphate dissolved in 1000 grams of water in terms of temperature function.

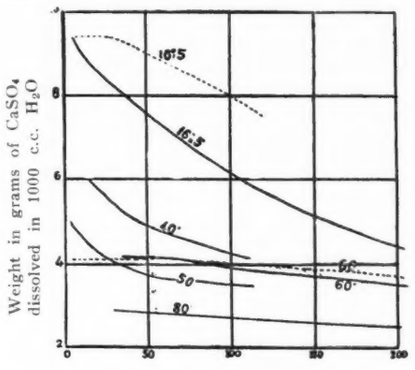
The path of these curves indicated that there was a continuous variation in the rapidity of crystallization, starting from a temperature of 60 deg. C. The influence of traces of $CaSO_4,2H_2O$ that were added to the solution on the speed of crystallization became under these conditions practically nil. For example there was merely a diminution of concentration of 0.45 gram of calcium sulphate at a temperature of 60 deg. C. in 1000 grams of water after 200 min., while there was a diminution of 1.5 grams of calcium sulphate at a temperature of 50 deg. C. after a period of 100 min.

In contrast to the above the author has studied the crystallization of solutions of calcium sulphate, at temperatures that varied between 60 and 80 deg. C., in concentrations which were higher than those corresponding to the solubility of $CaSO_4,2H_2O$ at the temperatures under consideration. These solutions were obtained by saturating with $CaSO_4,\frac{1}{2}H_2O$; thereafter the hemi-hydrate approaches the form of $CaSO_4,2H_2O$ only at a very slow rate of speed.

At a temperature of 80 deg. C. these solutions deposited rapidly the salt, $CaSO_4,2H_2O$, even when the crystallization commenced only at a temperature which was above 60 deg. C., until the concentration became equal to the solubility of $CaSO_4,\frac{1}{2}H_2O$, and thereafter it did not change in any appreciable manner after a period of 3 hr. had elapsed.

The author has attempted to apply the dimunition of the speed of crystallization at a temperature above 60 deg. C. to supersaturated solutions, in respect to $CaSO_4,2H_2O$, to the setting of plaster. This cannot appreciably take place at those temperatures and therefore it is possible to work the product for a prolonged period of time without injurying its setting properties in any way whatsoever. Now plaster is usually made with a large excess of water in comparison with the quantity that is required by theory for the formation of $CaSO_4,2H_2O$.

Dotted curves, 75 c.c. solution only.
Full curve, 75 c.c. solution + 0.179, $CaSO_4,2H_2O$.
Agitation 65 c.c. of air saturated with water per minute.



Time in minutes counted from end of filtration.

Curves showing effect of temperature

In compressing the plaster at a temperature approximately 80 deg. C., after having added to it just the requisite proportion of water, there is obtained, when the setting is later allowed to ensue at the ordinary temperatures, a product which possesses a high degree of mechanical resistance and the product can be readily polished and takes on the appearance of marble.

Modeling plaster, which has been mixed in the ordinary manner, 100 grams of the plaster to 45 c.c. of water, with a density of 1.45, has a resistance to compression of 340 kilograms, while the resistance of a portland cement which has been mixed with the minimum amount of water and then kept for two months under water is 1050 kilograms. The hardness of plaster which is treated in the manner described in the preceding paragraph is high which is due to the small quantity of water that is used in its preparation. The resistance to compression after a period of three days is 500 kilograms; after a period of 15 days it is 900 kilograms, and after a period of 28 days it is 1060 kilograms.

It is impossible to obtain a density that is greater than 2.18 which is due to the fact that contraction takes place during the setting of the modeling plaster. On the other hand a sample of alabaster, with a density of 2.32, gave a resistance of 350 kilograms only, which is due to the fact that is well known that the fine interlaced crystals yield a product which possesses higher degree of mechanical strength than a substance in which the crystals are agglomerated.

The tabulation which is given below shows as a function of the apparent density the resistance to compression of a cylinder 1½ centimeters in diameter and the same in height after a period of 15 days.

In conclusion, we have studied the variation with the temperature of the speed of crystallization of supersaturated solution of calcium sulphate, and we have applied the fact that the setting is practically nil above a temperature of 60 deg. C. to the preparation of a plaster which possesses a high degree of mechanical strength, resistance to compression, after the addition of a quantity of water which is less than what is usually employed in the mixing of plaster.

TABLE SHOWING COMPRESSIVE STRENGTH INCREASE BY DECREASING AMOUNT OF WATER AND INCREASING DENSITY OF PLASTER

Ten grams of modeling plaster mixed with 1.9 grams of water and compressed		Pressure employed to obtain a cylinder of two centimeters diameter kilograms	$CaSO_4,\frac{1}{2}H_2O$ obtained starting from precipitated sulphate	
Apparent density	Resistance to compression kilograms		Density	Compression Tension
1.75	300	100	1.55	100 100
1.85	640	200	1.78	250 300
2.01	1100	600	2.11	1050 2000
2.18	1700	2000	2.19	1400 4000

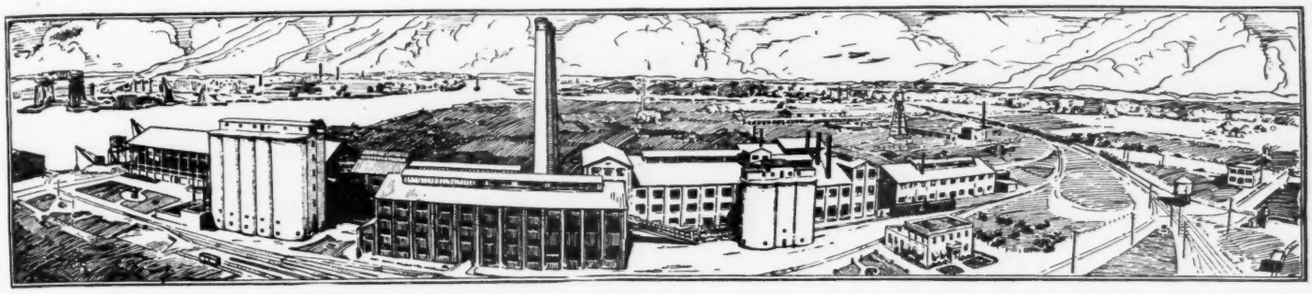
International Road Exhibition in the Argentine

AN International Exhibition of Roads, Transport and Touring, is to be held from February 1 to March 1, 1926, on the grounds of the Argentine Rural Society in Palermo, Buenos Aires, Argentina.

*From the French journal *Le Ciment,* 1925, pp. 316 and 317.

New International Cement Plant at Norfolk, Virginia

THE South's newest cement plant, with an annual capacity of 1,200,000 bbl., began operation at South Norfolk November 10, according to a statement issued recently by E. Posselt, vice-president of the Virginia Portland Cement Corporation, which is a member of the International System, one of the country's largest cement producers, with ten mills in North and South America having a combined annual production of 12,000,000 bbl.



Architect's drawing of the plant of the Virginia Portland Cement Corp., the Norfolk subsidiary of the International Cement Corp.—one of the few tidewater cements in the United States

In his statement, Mr. Posselt outlines the engineering problems encountered at Norfolk and tells of the measures taken to meet them, including the erection of a special plant at Chuckatuck, where the lime-bearing raw material used at Norfolk is obtained.

Mr. Posselt's statement follows:

"Since the International System perfected, in 1916, the first successful method for producing a high-grade portland cement from oyster shells, at its Houston, Texas, plant, there probably has been no more interesting development in cement manufacture than the perfection, by the Virginia Portland Cement Corporation, of a somewhat similar process whereby the lime content of its cement is obtained from marl, which consists primarily of shells laid down a thousand or more year ago.

"Early in 1924, the details of previous attempts to produce cement from the available materials before them, International engineers made a preliminary examination of the property. Convinced that a cement of the highest quality could be produced at Norfolk, the property was acquired.

"Then followed an exhaustive study of raw materials, and the development of plans, unique in many ways, to insure quality and uniformity. This preliminary effort took six months.

"Actual construction then began on what is now regarded as one of the country's outstanding cement plants. Work has been carried forward deliberately. Thoroughness has in every case had precedence over speed. The quality of the product and not the desire to produce cement at the earliest possible date has been the foremost consideration.

"While putting the finishing touches on the plant, trial runs of cement have been steadily subjected to the most severe tests demanded by International standards. These tests confirm preliminary analyses, and show that in both quality and uniformity Lone Star cement, which is the trade-name under which the product of the various International mills is marketed, actually exceeds U. S. Standard Specifications by a considerable margin.

"The problem of making a high grade cement from the raw materials available at Norfolk had baffled cement men for fifteen years. By using better raw materials, by developing a new process for preparing these materials, by installing the most modern cement-making apparatus, and by actual laboratory control in accordance with the requirements of the International wet-blending process of cement manufacture, this problem has been solved.

"The lime content of the marl at Chuckatuck is of excellent quality. In its preparation, in order to absolutely remove all foreign matter, an ingenious classification and 'washing' process has been installed in a plant erected at Chuckatuck. The marl passes through five separate steps in the process of classification and cleansing and, emerging as perfect lime, ideal in its fitness for the production of a super-grade cement is carried by barges to the plant at South Norfolk.

"In addition to the lime, the other ingredients of the cement are obtained from clay of unusual quality which is obtained from Waverly, Va., 60 miles from the plant.

"The Norfolk plant employs the International wet-blending process, which has been perfected over the past 25 years by the International System. Continuous tests for quality and constant laboratory supervision are employed as an integral part of this process. Analysis recently made of tests covering over twenty million barrels of cement produced by the International System show that the blending process used affords an absolute chemical control of the raw mix. The control of the mixture of raw materials before it is chemically combined by burning is recognized by authorities as the most important factor in the quality of portland cement.

"The Norfolk plant, located on the Elizabeth River, has access to a channel 30 ft. deep and is also advantageously located with respect to railroad lines.

"The new plant will employ a large number of men, most of whom will be drawn from Norfolk and surrounding territory. Due to the highly technical nature of the product and the processes of marketing, skilled men of long experience have been placed in the key positions. The personnel includes H. E. Hilts, formerly an executive of the Portland Cement Association, who will be manager of the new plant, and Dwight Morgan, who is sales manager."

Court Enjoins Operations of Sand Company

SAND excavations on the land of the Passaic Sand and Gravel Co., of Paterson, N. J., through which Paterson, in time, will run Cedar street, do not imperil the foundations of new school No. 15, it was ruled by Vice-Chancellor Bentley in a decision filed at Trenton recently.

The chancery court did, however, grant a temporary injunction to A. Forman, whose strip of land is sandwiched between that of the sand company and the school, to prevent the Passaic Sand and Gravel Co. from encroaching upon his property.

The board of education started the proceedings, fearing that sand slides, caused by the removal of sand in large quantities from the property of the Paterson Sand and Gravel Co., might undermine the foundations of the new school on the top of Sandy Hill. The report of an engineer engaged to study the situation stated, however, that there was no danger to the foundations of the school from any excavations of sand by the company.—*Paterson (N. J.) Guardian.*

Standard Silica Company Bonds Offered

GARARD & CO., Chicago, are offering at 100 and interest $225,000 in 6½% gold notes of the Standard Silica Co., Chicago (plants at Ottawa, Ill.).

Dated October 15, 1925; due October 15, 1927. Callable all or part on any interest date upon 30 days notice at 102½. Interest payable A. & O. without deduction for normal Federal income tax up to 2%. Denominations $100, $500 and $1,000. Standard Trust & Savings Bank, Chicago, trustee.

Properties.—The properties of company (an Illinois corporation) are located in the "Ottawa District," within a few miles of the center of the City of Ottawa, Ill. Property consists of 125 acres (owned in fee) of land underlaid with silica sand, a complete washing, screening and drying plant and other miscellaneous equipment. Plant has a present daily capacity of 1200 tons of washed, dried and screened silica sand. Company recently purchased properties of Crescent Silica Co., comprising 80 acres of land underlaid with silica sand, owned in fee, and a new and completely equipped reinforced concrete washing, drying and screening plant, fully electrified, having a present daily capacity of 1000 tons of washed, dried and screened sand. With the acquisition of this property, company will have a daily capacity of 3700 tons and when certain improvements are made, it is expected these properties will have a daily capacity of 4000 tons.

Business.—The business of this company is to produce, process and market washed, screened and dried silica sand used in the manufacture of silicate of soda, plate glass, bottle glass, boxboard and roofing paper, soap products, paint, chemicals, tile cornices, building stucco, abrasives, filters, for glass and marble cutting and polishing, and by sand blasters and etchers.

Purpose.—Proceeds of issue will be used to finance in part the purchase of the Crescent Silica Co.'s properties at Ottawa, Ill., and to provide additional working capital.

Income.—Net earnings are averaging approximately $8000 per month, and with the acquisition of the additional property it is conservatively estimated that the net earnings of the entire property will average at least $145,000 annually, or approximately three times the annual interest charge.

Construction Material Company Bonds Sold

TILLOTSON AND WOLCOTT CO., Cleveland, Ohio, report that practically the entire issue of the recent offering of first mortgage 6½% gold bonds of the Construction Material Co., Chicago, Ill., has been sold. (See ROCK PRODUCTS, June 27 issue, for details of offering.) The last sale was at par plus interest.

New York Stock Exchange Lists International Preferred

THE New York Stock Exchange has authorized the listing of $9,972,000 preferred stock (par $100).

CONSOLIDATED BALANCE SHEET AS AT MAY 31, 1925

(After giving effect to issuance of additional preferred and common stock and acquisition of Indiana and Alabama properties)

ASSETS

Cash	$ 2,485,516
U. S. Gov't bds. and c., mark. sec.	19,858
Accounts receivable (less res.)	2,133,103
Notes receivable	295,910
Inventories	3,578,865
Reserve for loss in exch. on net current acc'ts.	Cr.76,339
Investments	3,826
Deferred charges	301,703
Plan sites, lands, bldgs., mach., etc.	25,383,906
Total	$34,126,346

LIABILITIES

Accounts and accruals payable	$ 1,362,537
Dividends payable	459,877
Prov. for Fed. taxes	550,909
Res., fluctuation in price of sacks and contings	502,599
Statutory reserve	59,858
Capital stock of subs. with public	272,528
7% Cumul. preferred stock	10,161,800
Common stock (500,000 shs.)	15,611,385
Earned surplus	5,144,853
Total	$34,126,346

North American Cement Corporation Earnings

THE first consolidated income account of the constituent companies of the North American Cement Corp. for the eight months ended August 31, was made public recently and is as follows:

Net sales	$3,030,606
Costs and expenses	1,964,886
Operating profit	$1,065,720
Other income	33,238
Total income	$1,098,958
Interest, depreciation, depletion	141,385
Federal taxes	121,248
Net income	$ 836,325

—*Chicago Journal of Commerce.*

North American Cement Bonds on New York Exchange

THE New York Stock Exchange has authorized the listing of $5,989,000 sinking fund gold debentures, series "A," 6½%, due September 1, 1940, issued recently by the North American Cement Corp. (See August 22 issue, p. 68, for details of offering.)

Virginia-Carolina Chemical Company Reorganization

THE reorganization managers in a notice to the holders of bonds, obligations and stock of the company, state:

A sufficient amount of the bonds, obligations and securities of the various classes of company have been deposited under the reorganization plan to render it advisable to declare the plan operative. In view, however, of the privilege granted to the holders of the preferred and common stocks of the old company who participate in the plan of purchasing under the terms and conditions to be approved by the reorganization managers within 30 days after the reorganization managers have declared the plan operative, one-half of the common stock of the new company to be received under the plan by each holder of the debentures, bank debt and trade debt of the company and preferred stock of the Consumers Chemical Corp., at the price and in the ratio set forth in the plan, and in order to fix a record date for the determination of the subscription rights of the preferred and common stockholders under said privilege, the reorganization managers have determined before actually declaring the plan operative, to extend the time within which deposits will continue to be received until the close of business on November 9, 1925. As the reorganization managers intend to declare the plan operative on November 9 and to fix said date as the record date for the determination of the subscription rights of the preferred and common stockholders, deposits will not be received after said date unless otherwise determined by the reorganization managers and upon such terms as they may prescribe.

North American Cement Preferred Sold

R. F. De VOE & CO., Inc., New York City, have sold $1,220,000 7% cumulative preferred (a. & d.) stock of the North American Cement Corp. at 99 per share. Each two shares of preferred stock will carry as a bonus one share of common stock.

Dividends are payable quarterly, beginning in February, callable all or part on any dividend date upon 30 days' notice at 110 and dividends. Dividends exempt from present normal Federal income tax. The Chemical National Bank, New York, is transfer agent; National City Bank, New York, registrar.

The corporation was incorporated under laws of Delaware for the purpose of owning and operating plants engaged in the manufacture of portland cement and kindred commodities. It will be the successor by purchase to the Security Cement & Lime Co. and the Helderberg Cement Co.

The combined net income of the properties to be owned upon completion of transactions incident to new financing, for the year ended December 31, 1924, after depreciation and depletion, and after deducting annual interest requirements of the debentures presently to be outstanding and Federal taxes computed at the present rate, was $859,176, or over 3½ times the annual dividend requirements of the preferred stock presently to be outstanding. At the present rate of production, earnings for 1925 indicate a substantial increase over those for 1924.

United States Gypsum May Buy Beaver Board Companies?

ACQUISITION of Beaver Board Co. by the U. S. Gypsum Co. in order to strengthen its trade position was seen as a possible explanation for the failure of the latter company to declare as large a dividend as anticipated, despite the fact its earnings are running at the highest rate in its history. The U. S. Gypsum directors voted an extra dividend of 15% in stock and $2 per share in cash, in addition to the usual quarterly payments. This was smaller than has been declared in either of the last two years and was much below expectation.

The common stock which had advanced previous to the dividend declaration to around 200, dropped off to 163 immediately after. It had been expected that the extra dividend would be $5 cash and 35% in stock and the extras not coming up to this anticipation, resultant liquidation led to the sudden depression.

It has been thought that in view of the fact that U. S. Gypsum's earnings are understood to be running in the neighborhood of $20 a share on the stock that the distribution would be larger than in past years. However it was believed the mystery had been solved when stockholders of the Beaver Board Companies received a letter from Huntington, Jackson and Co., a New York brokerage firm, asking for an option on their stock at considerably above the recent market price. It was rumored in the street that the brokers were acting for the U. S. Gypsum Co. or at least with a view to selling to them, if sufficient options were secured.

This would be an explanation for the U. S. Gypsum Co. action, which the street felt last night was due to some unusual circumstances about which the public was in the dark. It was pointed out that the U. S. Gypsum Co. directors would not incur any material increase in stock capitalization and consequent gain in dividend requirements until possible acquisitions had been definitely acted upon.

Rumor Is Not Verified

Officials of the United States Gypsum Co. refused to verify the rumor that their company might be the purchaser of these voting trust certificates of Beaver Board. However, rumors pointed out several reasons for such a step, including one that U. S. Gypsum Co. might thereby improve its position in the building material industry and another that it would put an end to the patent litigation in which Beaver Board has been the defendant.

The letter to Beaver Board stockholders says:

"While the immediate future would seem to offer little prospect of a return for the stockholders, it is possible that purchasers might be found for your holdings who have faith in the future operations of the company, and who might be willing to take on stock with no immediate prospect of a return.

"We believe that there may be holders of voting trust certificates who, in order to secure some immediate return on their holdings, would be glad to dispose of their certificates for cash, and we are, therefore, asking you to grant us an option on such certificates as you may hold for a reasonable period of time, and would suggest till the close of business December 31, 1925.

Large Holders Give Options

"Large holders of these certificates have already given such options at prices around $38 per share and slightly higher, and if you care to join with them, we would ask that you kindly fill out the enclosed form of option and return to this office. We will then endeavor to have such options exercised at such prices as you may set, which we suggest should approximate the price indicated above."—*Chicago Journal of Commerce.*

United States Gypsum Pays Extra Dividend

THE directors of the United States Gypsum Co., of Chicago, have declared the following dividends on the common stock, par $20: (1) a 15% stock dividend, (2) an extra cash dividend of $2 per share, (3) a quarterly cash dividend of 2%. The directors also declared the regular quarterly dividend of 1¾% on the preferred stock. All dividends are payable December 31. The company on June 1 and September 1, 1925, paid extra cash dividends of 5% each on the common stock. (See August 22 issue, page 69.)

Wolverine and U. S. Gypsum Show Wide Range on Stock Market

MARKED increased in the number of sales of U. S. Gypsum common and preferred stock and of Wolverine Portland Cement Co. common stock, was noted on the Chicago Exchange where they are listed. Figures for their movement compiled by the *Economist* are as follows:

U. S. Gypsum, common, with $7,688,680 outstanding in shares of $20 par, low—112, February 20, 1925; high—209, September 8. Total sales 1925 up to September 8 were 119,388 shares. Low in 1924 was 78 and high 175. The preferred stock of $8,500,000 outstanding in shares of $100 par had a lesser range. Total sales to date in 1925 were 1956 shares and the range was from 113 on January 10 to 118 on September 24. The stock ranged from 102½ to 113 in 1924.

Price of the Wolverine showed a downward trend. Of the $1,000,000 outstanding in shares of $10 par, sales in 1925 amounted to 29,985 to date. The price ranged from 14½ on January 30 to 6¼ on November 14. In 1924 the movement was more uniform for prices ranged between 12½ and 13¾.

Celite Products Declares Extra Dividend

THE DIRECTORS of the Celite Products Co. of New York, at their recent meeting, voted the regular quarterly dividend of 25 cents per share on their common stock, plus an extra dividend of 25 cents per share both payable on November 1. The regular dividend at the rate of 1⅞% quarterly was also voted for the A and B preferred stock, payable November 1.

Bessemer Limestone and Cement Declares Extra Dividend

THE directors of the Bessemer Limestone and Cement Co., Youngstown, Ohio, have declared an extra dividend of 4% on the common stock and the regular quarterly dividends of 1½% on the common and of 1¾% on the preferred stock, all payable January 1.

Diatomaceous Products Company Reorganizes

THE Diatomaceous Products Co., Inc., Washington, D. C., incorporated about a year ago for the purpose of mining and marketing a deposit of diatomaceous silica near Dunkirk, Md., on the Patuxent river, has recently reorganized with the following officers: E. Francis Riggs, president; H. H. Carr, first vice-president; F. W. Newcombe, second vice-president and general manager; William Vaughan Howard, third vice-president and treasurer, and H. H. Sheets, secretary.

The company estimates its deposits at approximately 25,000,000 tons. It has completed a steel mill building, which is now ready for machinery, and it is expected that this will be installed and the plant ready for production in the late winter or early spring.

National Cement Company Plans Re-Financing

AT a shareholders' meeting of the National Cement Co. of Birmingham, Ala., held recently, a by-law was authorized giving power to the president and secretary to sell the assets of the company to a newly organized company of the same name. The company is in need of funds for construction purposes and a further offering of preferred stock amounting to $1,000,000 will be made so that the work on the mill may be continued.

Financial News and Comment

Ottawa Silica to Redeem Bonds

Notice is hereby given that the undersigned, Ottawa Silica Co., has elected to redeem all of its first mortgage 20-year 6% sinking fund gold bonds issued under the trust agreement between Ottawa Silica Co. and First Trust Co. of Ottawa, trustee, dated December 15, 1922, and will on December 15, 1925, at the office of the First Trust Co. of Ottawa, Ottawa, Ill., pay and redeem all of such bonds then outstanding at the principal amount thereof together with interest thereon to December 15, 1925, and a premium of three (3) per centum upon the principal upon the surrender of such bonds with all interest coupons thereunto appertaining maturing on and after December 15, 1925. Interest on these bonds shall cease to accrue after redemption date of December 15, 1925.

OTTAWA SILICA CO.,

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Alpha Portland Cement Co. (common)**	Nov. 19	100	110	116	1¾% quar. 25% ex. Dec. 1
Alpha Portland Cement Co. (preferred)**	Nov. 23	100	109	.....	1½% quar. Sept. 1
Arundel Corporation (sand and gravel—new stock)	Nov. 23	No par	35⅛	35⅛	30c quar. Oct. 1
Atlas Portland Cement Co. (common)	Nov. 24	No par	54⅜	55⅜	50c quar.
Atlas Portland Cement Co. (preferred)	.....	100	.....	.....	2% quar. Oct. 1
Atlas Portland Cement Co. (preferred)**	Nov. 23	33⅓	45	.....	2% quar. Oct. 1
Bessemer Limestone and Cement Co. (common)‡	Nov. 23	100	140	150	1½% quar. Jan. 1, 4% ex. Jan. 1
Bessemer Limestone and Cement Co. (preferred)‡	Nov. 23	100	106	106½	1¾% quar. Jan. 1
Bessemer Limestone and Cement Co. (convertible 8% notes)‡	Nov. 23	.....	115	125	8% annual
Boston Sand and Gravel Co. (common) (r)	Nov. 14	100	65	66	2% quar. July 1
Boston Sand and Gravel Co. (preferred) (d)	Nov. 19	.....	.....	80	1¾% quar. Oct. 1
Boston Sand and Gravel Co. (1st preferred) (d)	Nov. 19	.....	.....	90	2% quar. Oct. 1
Canada Cement Co., Ltd. (common)	Nov. 24	100	102⅜	103¼	1½% quar. Oct. 16
Canada Cement Co., Ltd. (preferred) (f)	Nov. 19	100	115	.....	1¾% quar. Nov. 16
Canada Cement Co., Ltd. (1st 6's, 1929) (f)	Nov. 19	.....	102	103	3% semi-annual A&O
Canada Crushed Stone Corp., Ltd. (6½s, 1944) (f)	Nov. 19	100	96	99	
Charles Warner Co. (lime, crushed stone, sand and gravel)	Nov. 21	No par	22	24½	50c quar. Oct. 10
Charles Warner Co. (preferred)	Nov. 21	100	98	102	1¾% quar. Oct. 22
Charles Warner Co. (lime, crushed stone, sand and gravel) 7s, 1929 (r)	Nov. 19	100	105	.....	
Cleveland Stone Co.	Nov. 23	.....	125	135	1½% quar., 1% ex. Dec. 1
Connecticut Quarries Co. (1st Mortgage 7% bonds) (s)	Nov. 21	100	102	.....	
Dolese and Shepard Co. (crushed stone) (a)	Nov. 11	50	58	.....	1½% quar.
Edison Portland Cement Co. (common)	Nov. 3	50	7½c(x)	.....	
Edison Portland Cement Co. (preferred)	Nov. 3	50	17½c(x)	.....	
Giant Portland Cement Co. (common)**	Nov. 23	50	39	42	
Giant Portland Cement Co. (preferred)**	Nov. 21	50	53	55	3½% semi-ann. June 15
Ideal Cement Co. (common)‖	Nov. 24	No par	77	79	$1 quar. June 30
Ideal Cement Co. (preferred)‖	Nov. 17	100	106	108	1¾% quar. June 30
International Cement Corporation (common)	Nov. 24	No par	69	70	$1 quar. Dec. 31
International Cement Corporation (preferred)**	Nov. 24	100	104	104	1¾% quar. Dec. 31
International Portland Cement Co., Ltd. (preferred)	Mar. 1	.....	30	45	
Kelley Island Lime and Transport Co.	Nov. 23	100	115	117	2% quar. Oct. 1
Lawrence Portland Cement Co.**	Nov. 23	100	110	.....	2% quar.
Lehigh Portland Cement Co.‖	Nov. 17	50	88	92	1½% quar.
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, expire serially up to 1930) (k)	Nov. 20	100	99½	100½	
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, expire serially from 1930 to 1935) (k)	Nov. 20	100	96½	98½	
Michigan Limestone and Chemical Co. (common)‖	Nov. 17	.....	23	.....	
Michigan Limestone and Chemical Co. (preferred)‖	Nov. 17	.....	23	.....	
Missouri Portland Cement Co.	Nov. 24	25	64½	64¾	1¾% quar. July 15
Missouri Portland Cement Co. (serial bonds)	May 29	.....	104½	104½	50c quar.; 25c ex. Aug 1
Monolith Portland Cement Co. (common) (c)	Nov. 20	.....	8¾	9¼	3¼% semi-annual
Monolith Portland Cement Co. (units) (c)	Nov. 20	.....	24¼	25¾	
Monolith Portland Cement Co. (preferred) (c)	Nov. 20	.....	7¾	8¼	
Newaygo Portland Cement Co.*	Nov. 20	.....	120	.....	
New England Lime Co. (Series A, preferred) (i)	Nov. 19	100	96½	99	
New England Lime Co. (Series B, preferred) (i)	Nov. 19	100	96½	99	
New England Lime Co. (V.T.C.) (i)	Nov. 19	.....	23	25	
New England Lime Co. (6s, 1935) (m)	Nov. 20	100	98	100	
North American Cement Corp. 6½s 1940 (with warrants)	Nov. 24	.....	100⅜	100¾	
North American Cement Corp. (units of 1 sh. pfd. plus ½ sh. common) (z)	Nov. 13	.....	94	99	2 mo. period at rate of 7%
Olympic Portland Cement Co. (g)	Oct. 13	.....	.....	£1⅝	
Pacific Portland Cement Co., Consolidated ($)	Nov. 20	100	85¾	88	
Pacific Portland Cement Co., Consolidated (secured serial gold notes)§	Nov. 19	.....	99½	100	3% semi-annual Oct. 15
Peerless Portland Cement Co.*	Nov. 20	10	6	7	
Petoskey Portland Cement Co.*	Nov. 20	10	9	10	1½% quar.
Phosphate Mining Co. (1)	Nov. 18	.....	1@5	.....	
Pittsfield Lime and Stone Co. (preferred)	.....	100	.....	.....	2% quar. Apr. 1
Rockland and Rockport Lime Corp. (1st preferred) (d)	Nov. 19	100	.....	98	3½% semi-annual Aug. 1
Rockland and Rockport Lime Corp. (2nd preferred) (d)	Nov. 19	100	.....	70	3% semi-annual Aug. 1
Rockland and Rockport Lime Corp. (common) (d)	Nov. 19	No par	.....	70	1½% quar. Nov. 2
Sandusky Cement Co. (common)*	Nov. 23	100	107	112	2% quar. July 1
Santa Cruz Portland Cement Co. (bonds) ($)	Nov. 20	.....	105	106	6% annual
Santa Cruz Portland Cement Co. (common) ($)	Nov. 19	50	85	95	$1 April 1
Superior Portland Cement Co.	Mar. 1	100	.....	120	
United States Gypsum Co. (common)	Nov. 24	20	163	165	2% quar. Dec. 31, $2 plus 15% stock ex. Dec. 31
United States Gypsum Co. (preferred)	Nov. 24	100	117½	118	1¾% quar. Dec. 31
Universal Gypsum Co. (common)†	Nov. 23	No par	21½	23	
Universal Gypsum V. T. C.†	Nov. 23	No par	19½	21	
Universal Gypsum Co. (preferred)†	Aug. 5	.....	76	.....	1¾% quar. Sept. 15
Universal Gypsum Co. (1st mortgage 7% bonds)†	Nov. 23	.....	99	(at 6½%)	
Union Rock Co. (7% serial gold bonds) (y)	Nov. 3	100	99	101	
Vermont Milling Products Co. (slate granules) 50 sh. common and 100 sh. pfd. (2)	Nov. 3	.....	$1 for the lot	.....	
Wabash Portland Cement Co.*	Aug. 3	50	60	100	
Wisconsin Lime and Cement Co. (1st Mort. 6s, 1940) (o)	Nov. 9	100	98½	100	
Wolverine Portland Cement Co.	Nov. 24	10	6½	6½	2% quar. Aug. 15

*Quotations by Watling, Lerchen & Co., Detroit, Mich. **Quotations by Bristol & Bauer, New York. †Quotations by True, Webber & Co., Chicago. ‡Quotations by Butler, Beadling & Co., Youngstown, Ohio. §Quotation by Freeman, Smith & Camp Co., San Francisco, Calif. ‖Quotations by Frederic H. Hatch & Co., New York. (a) Quotations by F. M. Zeiler & Co., Chicago, Ill. (b) Quotations by De Fremery & Co., San Francisco, Calif. (c) Quotations by A. E. White Co., San Francisco, Calif. (d) Quotations by Lee, Higginson & Co., Boston, Mass. (f) Nesbitt, Thomson & Co., Montreal, Canada. (g) Neidecker and Co., Ltd., London, England. (i) E. B. Merritt & Co., Inc., Bridgeport, Conn. (k) Peters Trust Co., Omaha, Neb. (m) Second Ward Securities Co., Milwaukee, Wis. (o) Central Trust Co. of Illinois, Chicago, Ill. (r) J. S. Wilson Jr. Co., Baltimore, Md. (s) Chas. W. Scranton & Co., New Haven, Conn. (x) Price obtained at auction by Barnes and Lofland, Philadelphia, on Nov. 3, 1925. (y) Dean, Witter & Co., Los Angeles, Calif. (z) Hemphill, Noyes & Co., New York. (1) Price obtained at auction by Adrian H. Muller & Sons, New York. (2) Price obtained at auction by Wise, Hobbs and Arnold, Boston, Mass.

Editorial Comment

Aggregate by Weight

Producers of concrete aggregate long ago discovered that the better way to buy, sell and use aggregates was by weight instead of by volume, and in many plants the scale for weighing carloads or truckloads is considered as important a piece of equipment as the rock crusher or the washing screen. The users of aggregate—contractors, engineers and architects—have been slower to appreciate this. But that there is progress is shown by the passage of an ordinance by the city of Los Angeles which compels every person or firm selling aggregates in truckloads to furnish a certificate of weight issued by a public weighmaster with each load. The plant scales or the public highway scales may be used for weighing and if the plant has no public weighmaster any employe may be so designated by the posting of a $1000 bond.

ROCK PRODUCTS has so often advocated the sale and use of aggregate by weight that its approval of the ordinance may be taken as read. It will interest our readers more to know that others have the same viewpoint as is shown by an editorial in the current issue of the *American Contractor* in which the advantages of the ordinance are explained:

> If the regulation is upheld it will result in placing the entire aggregate movement of the Southwest upon a weight basis. Contractors who are careful buyers will be better pleased to buy such materials by weight and there will be little profit to material companies in making a double estimate of material deliveries. It is a peculiar comment on the business acumen of contractors, however, that a legal enactment is required before pressure is brought to bear upon dealers to inaugurate this system of selling. It has long been known that a cubic yard of sand carrying 8 or 10% of water may contain but 60 or 70% of a cubic yard of dry sand, while variations in weight do not vary more than 5%. Yet some dealers who have voluntarily gone on a weight selling basis have been forced to undertake an extensive educational program to convince contractors of the desirability of buying in this manner. It is so easy to translate an estimated concrete yardage into terms of so much cement, sand and coarse aggregate and the fact that such transactions nearly always require an excess of aggregates over the estimated quantity has been accepted with too much resignation. If the Los Angeles traffic regulation rule will focus attention upon the economy of buying by weight it will be a boon to the construction industry.

The Phosphate Industry

Advices from both the Tennessee and Florida phosphate fields are that the industry is recovering from the long period of depression that closed so many plants and kept most of the others working on part time. The price is reported to be "firming" and the demand increasing at the same time that some of the shut down plants are reopening and putting their product on the market. This is pleasant to report and it is even pleasanter to learn that the long period of depression is not without its credit side. Methods of excavating and washing have been improved and wastes have been prevented. Moreover much research has gone on, some of it of such a nature that it promises to bring radical improvements in the industry. It is not probable that there will be any boom in phosphate rock production, and a boom is the last thing that the wise producers want. But it seems probable at this writing that the phosphate industry is really on the upgrade and beginning the steady even progress that marks practically all of the rock products industries as the year 1925 draws to a close.

The South Dakota Cement Plant

The financial condition of the South Dakota state cement plant is given elsewhere in this issue, and a reading of the figures is all the argument that is needed against the building and operation of state rock products plants—especially in sparsely-settled states like South Dakota, where only a limited amount of material can be used. The report shows that while the plant appears to have made sufficient sales to cover operating expenses, there is little above these to pay the interest on the bonds which were sold to build the plant, interest owed the bank and on the appropriation which was made to keep the plant going, plant depreciation and plant renewal.

All these interest and depreciation charges are just as much a part of the cost of making cement as the payroll and the repair bill. The loss in these amounts to at least $200,000, and apparently there is little chance for making up this deficit. If a private concern were in the same condition as this state-owned plant, the bondholders and other creditors would be considering a receivership, but as it is state owned it will probably be bolstered up by more appropriations and kept running.

If individuals had made the mistake of starting a cement plant in South Dakota, where it appears that there is too little cement used to justify a plant, they would have taken the loss and the state and the community in which the plant was located would have suffered no more than a temporary setback. But with a state-owned plant the taxpayers will either keep on making good the deficits, or, if the plant is shut down to stop losses, they will still keep on paying interest on the bonds.

It is to be hoped that this report will be broadcast sufficiently so that some of the states which are discussing the advisability of state-owned plants will understand what a state is let in for when it goes into the cement business. There are plants enough in the United States, built and building, to supply the possible demand, and private capital may be depended upon to put up another plant whenever market conditions justify it. So long as this condition exists, another plant means a loss, and a comparison of state-owned and privately-owned plants shows that it is the state-owned and not the privately-owned plant which is bound to lose.

Plans Maturing for National Crushed Stone Convention

C. M. Doolittle, President of Canadian Crushed Stone Company, Ltd., Taking Active Part in Preparations at Montreal

IF the meeting of the New York Crushed Stone Association at Buffalo, N. Y., on November 6, was any kind of a forecast of what the Montreal convention is going to be like, we can guarantee our crushed-stone producer friends the very best meeting the crushed-stone industry has ever had.

President Otho M. Graves, of the National Crushed Stone Association, was there. In a general way he sketched the reasons for selecting Montreal and the kind of a program he was working out. C. M. Doolittle, president of the Canada Crushed Stone Co., Ltd., Dundas, Ont., was there. Mr. Doolittle is regional vice-president of the National Crushed Stone Association for Canada, and will be the toastmaster at the Montreal banquet.

Maj. T. M. Ripley, division engineer, New York State Highway Department, was there, and he made a most interesting and inspiring address on what the future had in store for the crushed-stone industry if it wholeheartedly pursued the proposed research program. He congratulated the association on the selection of A. T. Goldbeck as its research engineer. Mr. Goldbeck, he said, held the highest reputation in highway engineering circles.

Major Ripley had the whole audience hanging on his words, as he elaborated some of the most pressing problems in the use of crushed stone for highways. When he had finished, President Graves asked: "Will you come to Montreal next January, Major Ripley, and tell the whole crushed-stone industry some of these things?"

The major began sparring for time to think it over, but the invitation was so spontaneously unanimous, with everyone on his feet, that the major himself got thoroughly enthused.

"*Sure,* I'll come," were his parting words. Now, any crushed-stone man who doesn't go and hear Major Ripley is going to miss the best talk he ever imagined on crushed stone!

Mr. Goldbeck was there, and he reviewed briefly the things he had uncovered that need research work in the crushed-stone industry. If there are any doubters of the feasibility of profitable crushed-stone research, Mr. Goldbeck's cold, unimpassioned, but most interesting and comprehensive analysis of some of the problems ahead will more than convince them.

J. R. Boyd, secretary of the National Crushed Stone Association, was there. Everybody is going to like him just as the New York members did. His pleasing address and enthusiasm is going to make the Montreal convention the most notable in history. Already a fine program is in prospect. Particular emphasis is being laid on operating problems.

On November 14 President Graves, Vice-President Doolittle and Nathan C. Rockwood, of the Manufacturers' Division, were in Montreal and inspected the Mount Royal and Winsor hotels. Everything is now set for the biggest and most interesting convention in the history of the crushed-stone industry. It is not necessary to enlarge on the attractions of Montreal.

C. M. Doolittle

Miami to Have New Crushed Stone Plant

WE HAVE been directly informed by Edwin C. Moore that the organization of the Miami Crushed Rock Corp., a new $300,000 business has been completed at Miami, Fla., and the firm will begin operations within a short time.

The new corporation has purchased acreage in the Dade county district at Kendall, Fla., and will erect a modern rock crushing plant equipped with washers and screens for the production of more than 1000 yd. per day.

The object of the corporation is to quarry coral rock, crush, wash and screen and separate the different sizes and sand.

The officers of the corporation are: Edwin C. Moore, of Coral Gables, Fla., president and general manager; Clarence G. Sayles, vice-president and assistant treasurer, and Harry L. Finkle, treasurer and secretary, both of Providence, R. I.; W. W. Sayles, Miami, director, and George E. Grindall, of Miami, is general plant superintendent.

The men actively associated with the corporation are well known in the rock business, and the success of the concern is assured with their experience gained in this field of manufacturing.

Production of Lime Rock Increased in Ocala, Florida District

ACCORDING to C. G. Rose of the Ocala Lime Rock Co. the production of lime rock has grown from 1920, when it was first mined and shipped in large quantities, from 10 cars a day to 250 cars as a maximum so far handled on the Atlantic Coast Line and the Seaboard Air Line.

Specification on all first class state and federal highways call for crusher run Florida lime rock. Much of the lime is burned at Ocala and shipped all over the south as the commercial product.

The deposits in Marion county are the most extensive of any in the state, although there are a few deposits in Alacshua, Levy and Citrus counties of similar material.

The demand for the material exceeds the supply available, due to the embargo which has curtailed the output about 50%.

The large deposits in various sections of the county have become quite a factor in the sale of real estate, which has steadily become more in demand for agricultural purposes.—*St. Petersburg (Fla.) Times.*

Atlas Rock Company Starts Work on Large Contract

WORK has again been resumed at the Atlas Rock Co. plant at Oakdale, Calif., after a shutdown of about three weeks to allow a general overhauling of the machinery, prior to starting on the big Melones dam contract. The company has just opened another bar of gravel located about a mile below the first bed, and a railroad is being built to carry the gravel to the crushing and sorting plant.

A new gasoline locomotive has also been installed and preparations are being made to greatly enlarge the operations of the company. About 30 men are now employed there. Fifteen carloads of ballast are being shipped daily for use on the Melones dam railway, and the company has also just received a contract for material to be used in paving.—*Stockton (Calif.) Republican.*

Atlanta Convention Will Interest Every Producer

Action of the Convention Will Have Much Influence on the Future of the Industry

THE program for the forthcoming convention of the National Sand and Gravel Association has not yet been published in detail but among the features is to be a paper by W. M. Weigel, technical mineralogist of the Bureau of Mines, on special sands. At the Chicago convention last January this was a subject in which the members showed a lively interest, for it is recognized that many plants are throwing away a part of their product which only needs preparation by proper washing and grading to give it a commercial value.

Railway ballast is another subject sure to receive adequate presentation and discussion. The ballast committee of the association has done wonderful work in the past year and has made great progress in finding out the needs of the railroad (that is, just what constitutes a good gravel ballast) and how the producers can meet those needs.

It is promised, in fact, that every need of the industry will be covered by the papers that will be presented and the discussions which will follow them. From the programs of past conventions it is evident that this promise will be kept.

Many new members will be present at this convention. The work inaugurated by the convention of 1925 has resulted in bringing in many new members and some of them are among the most important producers of sand and gravel in the country.

The work of the research department is progressing and it will be explained and discussed at the convention. Stanton Walker, who was formerly with the Structural Materials Research Laboratory of the Lewis Institute has been placed at the head of this department. Mr. Walker is a recognized authority on concrete and so large a part of the production of sand and gravel goes into concrete that this alone will insure his value to the association. It is said that research will be a major activity of the association hereafter. Experience has shown that it is almost as important to producers to be sure that their product is properly used as it is to produce good material, for the best material may be condemned if it is improperly used in concrete, plaster or any similar product. Hence any research in the uses of sand and gravel is of equal value both to the producers and to those who use them.

The association has made a great advance in the year now coming to an end. Few associations can show such a gain in membership, not only in the number of new member companies but in the character of the new membership. This is due to the work that was begun by the convention of 1925. The association is now a well organized and powerful force. It will largely depend upon the coming convention how this force shall be directed and applied.

The future of the sand and gravel industry is thus largely in the hands of the coming convention and it is to be hoped that every producer will realize this and make an especial effort to attend. All producers will be welcome whether members of the association or not.

Atlanta is a fine city and an excellent place in which to hold a winter convention. There are excellent hotels and the Atlanta-Biltmore, in which the convention is to be held, is one of the most commodious and beautiful hotels in the South.

A. P. Burke, prominent Atlanta producer and member of executive committee of the N. S. G. A.

January 21 and 22 are the convention days and hotel reservations should be made as soon as possible.

New Jersey Sand and Gravel Production for 1924

THE Division of Geology and Topography of the New Jersey Department of Conservation and Development, in co-operation with the Division of Manufacturers, United States Bureau of the Census, has completed the compilation of the statistics of sand and gravel production in New Jersey in 1924. These statistics show a notable decrease in both the total quantity and value in 1924 as against 1923. The total quantity of sand and gravel produced in 1924 was 3,921,521 short tons, and its total value was $3,331,712, as compared with the 1923 total of 6,101,204 short tons, valued at $4,381,855.

The total output of sand alone in 1924 was 3,098,673 tons, valued at $2,601,130, and the total output of gravel alone in 1924 was 822,847 tons, valued at $730,582. Of the 1924 production the chief sand items in order of their rank were: Building sand, 1,385,392 tons, valued at $815,315; molding sand, 424,470 tons, at $580,856; paving and road-making sand, 891,126 tons, valued at $519,637; glass sand, 184,831 tons, valued at $398,297, and cutting and grinding sand (including blast sand), 101,056 tons, valued at $250,698.

The chief gravel items in 1924 were building gravel (concrete and mortar), 594,592 tons, valued at $523,486, and paving and road-making gravel, 228,255 tons, valued at $207,096. It will be noticed that the paving and road-making sand and the paving and road-making gravel taken together amount to 1,119,381 tons, valued at $726,733.

Myers Company Plans Increased Output

ANNOUNCEMENT was made recently by officers of the Myers Sand and Gravel Co., of Anderson, Ill., that the company would expend about $20,000 within the next few months on machinery that will triple the production of the plant.

The company will purchase new washing and grading machinery, which will be installed in the early part of the next year. The increase in equipment is to take care of the large volume of business that the company expects to secure in the spring.

New machinery and other equipment that is to be purchased will increase the capacity of the Myers plant from 125 to 400 yd. a day.

Officers of the Myers company are: H. P. Hardie, president; Linfield Myers, vice-president, and C. I. Smith, secretary.

Du-Co Sand Company Increases Output

THE Du-Co Sand Co. of Albany, Ga., has been expanding rapidly since its organization in 1919. It has been necessary to enlarge their plant buildings twice since that time. The present plant is 60x100 ft. with concrete basement and totals 14,000 sq. ft. of space. The company operates several sand pits in Dougherty county and produces all grades of building sand. The output is nearly all absorbed by the local contractors and a fleet of five trucks is maintained for deliveries. Business for 1925 has increased 50% over that of a corresponding period in 1924. T. M. Mitchell is president of the company and O. G. Hall, superintendent.

Portland Cement Association Lays Corner Stone of Its Own Building

Annual Meeting at Chicago Re-elects President Blaine S. Smith—Record-Breaking Attendance

ALL RECORDS of attendance at Portland Cement Association meetings were broken at the annual meeting held at the Drake Hotel, Chicago, November 16 to 18 inclusive. More than 365 individuals representing 75 companies registered.

The following officers were re-elected: President, Blaine S. Smith, general sales manager, Universal Portland Cement Co.; first vice-president, Lowell R. Burch, vice-president, Atlas Portland Cement Co.; second vice-president, C. A. Irvin, vice-president, Alpha Portland Cement Co.; treasurer, John W. Boardman, vice-president, Huron and Wyandotte Portland Cement companies.

In addition, the following were elected to the board of directors: John Treanor, H. Struckman, L. C. Morton, H. F. Jennings, Charles Boettcher and William S. Speed.

In addressing the membership at the business session, President Smith called attention to the favorable outlook for the construction industry and presented a brief summary of construction in 1925.

Outlook for 1926 Favorable

Mr. Smith said: "Many cities have lagged behind in necessary facilities for sewage disposal, water filtration plants, and other municipal and civic improvements having important connection with community health and welfare.

"With the financial recovery of the farmer an established fact, with general business conditions good, and with the need for municipal improvements and industrial enlargements, 1926 presents a favorable outlook for the construction industry.

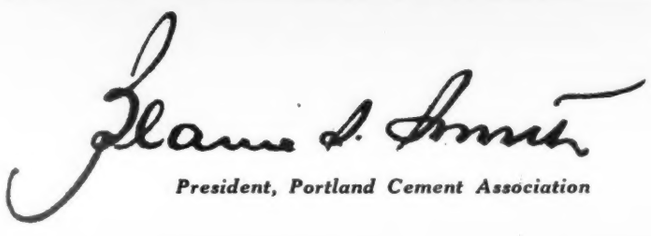
"Awards for the first ten months of this year for concrete pavements are greater than for any twelve months on record. The equivalent of 5752 miles of 18-ft. road were completed and placed under traffic from January 1 to October 31, 1925.

"Only three years ago the Lincoln Highway Association completed a strip of pavement 40 ft. wide near Dyer, Ind., which was heralded as the 'Ideal Section.' Many said that a 40-ft. width of concrete would never be needed on our highways. Yet there will be completed this year a highway from Detroit to Pontiac, Mich., which, for its 16 miles, has a total concrete paved width of 88 ft., consisting of two separate lanes each 44 ft. wide, one for northbound and one for southbound traffic. Again, Wayne county (Detroit) Mich., has established as its fixed policy an ultimate minimum width of 40 ft. of concrete on its entire 440-mile system of county roads.

"The need for more roads and wider roads is indicated by the fact that over 17,000,000 of the 19,500,000 cars in the world are in the United States. Estimating 1925 United States production of new vehicles at 3,800,000, the space needed merely to store these cars would require 4318 miles of 18-ft. road. To keep them moving requires much more, so that 5752 miles of concrete roads built in 1925 are not nearly sufficient to accommodate the growing motor traffic.

"In the cement industry, the year has been marked as one of ample supply of cement.

"Although shipments for 1925 will doubtless exceed those of last year, stocks have consistently been higher than in 1924. The explanation lies in the large increase in cement manufacturing capacity made during recent years, which have brought productive capacity up to an estimated total of more than 185,000,000 bbl. a year, or some 25% in excess of the largest year's demand."



President, Portland Cement Association

Cornerstone Laying

At the conclusion of the business session about 250 of those in attendance took busses from the Drake to the site of the Association's new building, Grand avenue and Dearborn street, to participate in the cornerstone laying ceremony.

The principal address was by Robert W. Lesley, of Philadelphia. Mr. Lesley was one of the organizers of the Portland Cement Association, and its first president. He is now an honorary member of the Association.

Other addresses were made by Blaine S. Smith, president of the Association, and by B. F. Affleck, chairman of the Association's new building committee, of which L. R. Burch and E. M. Young are members.

The cornerstone laying marked the culmination of several years of planning on the part of the Association toward the end of owning and occupying its own home.

The new building was designed by Holabird and Roche and is being erected by the Turner Construction Co. of Chicago and New York. Its five stories and basement provide quarters for the Association's research laboratory and general offices. For the past ten years the laboratory has been located in the Lewis Institute, Madison and Robey streets, and conducted co-operatively with the institute. But the laboratory work also has grown rapidly in importance and has steadily outgrown the accommodations which the Institute could provide.

Many interesting and advanced features are to be incorporated in the Association's new home. Naturally, the building is concrete throughout, except for the steel used for reinforcement. Concrete is being proportioned, mixed and placed after scientific methods of control, to insure uniformly high quality. The result will be a structure possessing the maximum of utility and economy obtainable. The exterior will be Benedict concrete stone, as will be much of the interior detail. Concrete art marble will be used freely.

Banquet Speakers

A banquet winding up the three-days' sessions was held at the Drake Wednesday evening. One of the speakers was United States Senator Arthur Capper, nationally known also as a publisher of many farm papers and the *Topeka Capital*. Senator Capper spoke on "The Farmer's Yesterday and Tomorrow."

Another speaker was John J. Earley, well known architectural sculptor of Washington, D. C. Mr. Earley's talk was on "The Concrete of the Artist and of the Architect."

One of the most outstanding examples of Mr. Earley's work is at the entrance to Washington Park, Chicago. This is the statue of the Fountain of Time, conceived and designed by Lorado Taft, and executed in concrete by Mr. Earley. Another monumental work of Mr. Earley's is the interior of the Church of the Sacred Heart in Washington, of which there exists no finer example of the color possibilities of concrete. There are many other of his works elsewhere.

Robert Leslie Traces Growth of Association—Its Formula for Success

In his address at the laying of the cornerstone of the Association building, Robert Leslie said, in part:

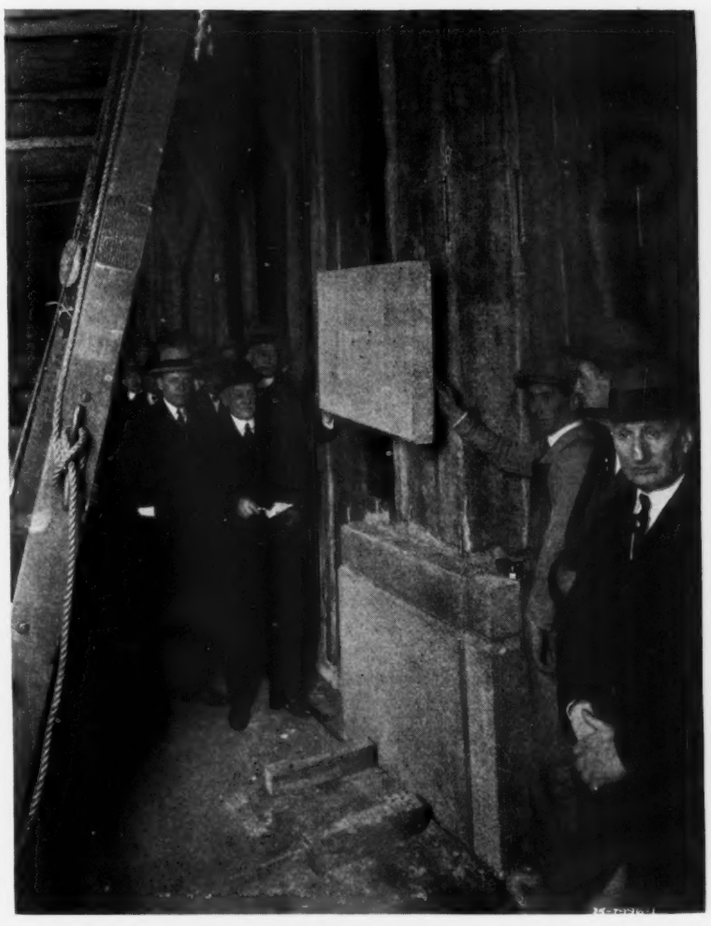
"In looking about us we can see the solid physical foundation upon which this great building is to stand, and we can also see the cornerstone laid today. These are the physical evidences of work done, and well done; but more important than all this is the substantial foundation of service upon which this building is to be reared and maintained, its cornerstone the symbol of the scientific truth which is to mark its right to existence.

"When the Portland Cement Association was formed, over twenty-three years ago, two great developments took place within the first year of its existence. These were, first, the work of the committee on new uses, and, second, the recognition of our new and struggling organization by the great engineering societies of the country, which invited it to participate as a member of joint committees dealing with the making of specifications for portland cement and in connection with the many uses of concrete and reinforced concrete. The latter development was at the time a unique condition affecting a single trade organization, our Portland Cement Association, and was a recognition of its devotion to truth and science. The two developments together represent the great scientific and educational purpose of this Association, and the building which we are dedicating today, in which the work of the original founders of the Association is to be carried on, denotes this purpose in its fullest degree.

"When the committee on new uses made its first report, it dealt with a few subjects; and while in a humorous way it indicated that by the use of concrete the average citizen could be carried from the cradle to the grave by being christened in a concrete font and finally buried in a concrete coffin, this was but a small part of the great work to be done in the future years. In a recent booklet covering the uses of cement and concrete, over 300 such uses are described, mentioning every phase of human construction, among them everything of a structural nature going to make the homes of man; the roadways, pavements, alleyways that make his moving about comfortable and easy; the railroad bridges, viaducts, abutments which make his transportation safe; the aqueducts, dams, reservoirs, conduits which give him good and pure water; the sewers, sewerage plants, drains which protect him from disease; the stables, pig pens, silos, barns in which his food is produced and safeguarded; and finally the great manufacturing plants, from which come the many necessities of daily, human life.

"These uses, taken as a whole, indicate the purpose of our Association to deal with the welfare of the community in the mass and not with the individual only, as is done in the case of many health institutes and similar organizations in America and Europe, which have as their ward man in his individual capacity, and not as a member of society in the aggregate, with all its many requirements.

"The purpose of the Portland Cement Association, were it to have devoted itself solely to developing new uses for portland cement and concrete, might well have been questioned, as involving self-interest, and its work also criticised as being a mere expression of a trade or commercial association. It is at this point where our Association departed from the ways of the ordinary trade body and went from the plains of commercialism into the heights of scientific research, not for the individual profit of the cement companies, but for the educational knowledge that thorough engineering training and research would give to the world in the use of the great plastic construction material, portland cement.



Laying the cornerstone of the new Portland Cement Association building—Robt. W. Leslie with the silver trowel, on his right Blaine S. Smith, on his left B. F. Affleck

Research and Promotion Go Hand in Hand

"The converging of these two purposes, the developing of new uses for portland cement and the research for the highest scientific knowledge in the field of the greatest safety and greatest economy in developing these uses, was a marked epoch in the history of our organization.

"While it is true that our Structural Materials Laboratory was not formally established until 1916, yet it must not be forgotten that, as far back as 1904 our Association established at the St. Louis World's

Fair, in a building of its own, what was probably the first scientific and research laboratory ever created by any American trade organization.

"Research in the field of concrete by our Chicago laboratory has been going on for a number of years, quietly and unobtrusively. Thousands of experiments have been made and years of work have been spent in the Structural Materials Laboratory, and it is only within the last year or so that the cumulative effect of practical use by practical engineers in actual building has demonstrated the truth and correctness of the laboratory's conscientious work in the interest of economy in concrete construction by the use of the proper proportions of water in concrete. The laboratory work instead of being devoted to tests of cement for the use of the manufacturers has been altruistically devoted to increasing in the public at large the scientific knowledge of the use of concrete; and while the work of the old committee on new uses has been broadened year by year in the creation of new committees devoted to specific branches of the work and giving information to those who would build reservoirs, dams, bridges, fireproof homes, concrete roads, etc., this work is now done with the knowledge that in the method recommended for handling the concrete the authority of the Portland Cement Association laboratory is fully recognized by engineers and contractors having to do with concrete construction of every type.

"It is work such as this that has raised the United States from the position of a small producer of portland cement to that of the world's leading producing nation, manufacturing annually more than all the nations of the rest of the world combined. It is just such convincing, intelligent, thoroughgoing work that has caused a ten-fold increase in the output of portland cement since the formation of our Association to the present day—from 17,000,000 to 160,000,000 barrels in a period of 23 years.

"While the laboratory requires much space for its splendid work, the committee on new uses, which now has been superseded and expanded into a group of new committees and departments dealing with cement products, highways, railways, structures, houses, farm uses, sewers, improvement of building codes, better insurance rates for concrete buildings, advertising and publications, general education, etc., needs additional elbow room. The accident prevention and insurance bureau, with its increased duties in the guarding of the life and limb of cement mill employes, requires more room; and the important committee on conservation, with its study and research aimed at improving plant equipment and manufacturing methods, to assist the manufacturer in improving the quality and reducing the cost of his product, needs additional housing facilities. To all these departments there is to be added the general office administration, with its financial and secretarial branches and its large organization controlling all the general office bureaus and thirty district offices scattered East and West, North and South, all over the United States, which also requires additional facilities.

Key to the Association's Success

"The business has grown indeed, and the new building is not a luxury but a necessity, and especially so when the aims of our organization are fully stated. These are:

"(1) *To increase the knowledge, utility and use of portland cement through scientific investigation, public education and associted promotion.*

"(2) *To 'sell' the idea 'Concrete for Permanence'; in other words, the use of cement, but not the commodity. Therefore it is not concerned in the brand of cement used.*

"(3) *To perform only such functions as cannot as well, if at all, be performed by its member individually.*

"(4) *To undertake only such activities as are for the common good, and whose benefits when taken advantage of accrue alike to all contributing members.*

"(5) *Its conduct is jealously guarded and made to conform scrupulously in all respects to the highest concept of commercial morality and the strictest interpretation of the laws of the land.*

"In the reduction through Prof. Abrams' studies of the amount of cement required to be used in concrete, thus cheapening the finished work to the consumer; in the studies of the conservation committee in the field of improved machinery, kilns, etc., with the economies thus made in the production of cement, and lastly in the work of our safety committee, protecting at every step the life and person of our employes, it is clearly demonstrated that our Association, with its successful blending of the self-interested and altruistic interests of its members, is unique. It has no counterpart in American industrial history."

Cement Mill Sessions

The report of the committee on accident prevention and insurance was most encouraging. In June of this year as a result of a no-accident month's campaign, 72 of the 125 plants entered came through without an accident. The report covered practically the same ground as was covered in Rock Products' report of the Cement Mill Section meeting of the National Safety Council at Cleveland, Ohio, September 29 and 30. A significant fact illustrating this progress in accident prevention through association activities is that the worst plant records today are better than the best plant records in 1919, when the work was begun.

"The Foremen and Safety Committees in a Cement Plant," was the subject of a paper by Maj. Henry A. Reninger, special representative, Lehigh Portland Cement Co. Major Reninger traced the history of the safety work of the Association from 1913, when original committee on accident prevention and insurance was appointed.

Specifications for the Successful Foreman

Major Reninger made it clear that the successful foreman was the one who believed in accident prevention and who really felt a moral responsibility for the welfare of the men under him. Records show that accidents materially slow up production, even when a new man replaces the one hurt; and every wide-awake foreman looks to maximum production with the lowest relative cost as the test of his ability.

Being a successful foreman, it appears, is a matter more of winning the respect and co-operation of workmen than of bulldozing them, as used to be the standard of former times. No favoritism, fair dealing, and sincerity are the ways to win respect and confidence, without which there is no real co-operation. One great advantage of safety work is that it provides the opportunity to develop and to demonstrate these now very essential qualities of a successful foreman.

Cement-Mill Problems

The conservation committee of the Association is engaged in extensive studies of kiln capacities, and the various factors which effect kiln capacity. Many instructive and illuminating data are available to members of the Association. The past year's studies have also dealt largely with the grindability of cement clinker under various conditions of age and methods of cooling. These promise to be of much practical value to member companies. Eventually the investigations will be extended to include the relative grindability of wet-process and dry-process clinker.

Grinding-mill mediums and mill linings are also being intensely studied.

Rubber Grinding Mill Linings

The theory and practice of wet grinding with particular reference to the economic application of rubber lining, was the subject of a paper by B. W. Rogers, of the B. F. Goodrich Rubber Co., Akron, Ohio. The paper was illustrated by lantern slides and was very instructive. The importance of operating a ball mill at somewhere near the correct theoretical speed was demonstrated, and formulas were given for determining the correct speed for different loads.

Grinding in tube mills is done between the balls or other grinding medium; very little is done between the medium and the shell. Rubber linings, apparently, by cutting down the slippage between the grinding medium and the shell, increase the efficiency of the mill. Wave rubber linings are considerably more effective than smooth rubber lining.

Other factors which have a large influence on the efficiency of ball mills are the speed of revolution, which can be determined theoretically, and the ball load. Rubber linings increase the efficiency of the mill, or rather equalize the efficiency, for a greater range of loading than do smooth steel lining.

In response to questions Mr. Rogers said that on the basis of these tests rubber lining could compete on an economy basis with steel, even at the present price of rubber. Rubber linings, he said, could not be used for lining dry-grinding mills because of the heat generated. Rubber linings can not be used for lining chutes or elsewhere where there is impact, for impact will quickly destroy rubber.

Closed Circuit Wet Grinding

G. W. Reppetti, of the Dorr Co., New York City, read a paper entitled: "Suggested Comparison of Wet Grinding in Metallurgi-

cal and Cement Industries," in which it was evident that the author did not believe that the cement industry had kept pace with developments in metallurgical practice.

Mr. Reppetti concluded from experience in metallurgical industries that (1) It is believed the capacity of fine grinding wet mills in cement plants can be increased at least 50% by close circuiting them with classifiers. (2) The overflow from the classifier can be thickened to a moisture content of a slurry produced in the same mills in open circuit. (3) The thickened sludge, or slurry, can be dewatered in a continuous filter to a filter cake containing about 17% water.

The paper also described in detail the use of the Dorr agitator for cement slurry.

Governors to Appoint Delegates to Road Builders' Convention

PRESIDENT W. H. CONNELL of the American Road Builders' Association has invited all governors, throughout the United States, to appoint delegates to attend the American Road Builders' convention which will be held in Chicago, January 11 to 15, 1926.

It is expected that 30,000 persons will attend this convention, and the exhibitors have arranged for over 300 carloads of road building machinery and supplies to be on exhibition, so that the delegates may have an opportunity of inspecting the latest and most improved road building equipment.

The program will be divided into two sections, one of special interest to highway engineers and the other to highway constructors. Some of the subjects to be presented and discussed are the following:

Governing Factors in the Selection of Pavement Types
Recent Developments in Concrete Pavements
Recent Developments in Bituminous Pavements
Snow Removal
Surface Treatment of Highways
Increased Costs Due to Improper Fine Grading Methods
How to Stop Cement Overrun
Winter Letting of Road Work

The convention and exposition will be held in Chicago from January 11 to 15 during Good Roads Week, which is being sponsored by many road building organizations, and will be appropriately observed throughout the country at that time by Chambers of Commerce, civic clubs, and local organizations.

Merger of Southern Lime Producers

GEORGE T. WEIGART, of Batesville, Ark., general manager of the Batesville White Lime Co., and others who are associated with the lime industry of Tennessee, have completed the organization of the Southland Lime Co. and taken over five of the largest concerns in Tennessee. The plants merged into the new organization are the Rauscher Lime Co., of Erin; Jesse Allen Lime Co., Burns; Palmyra Lime Co., Palmyra; Warren Lime Co., Adams, and Everett Lime Co., Tennessee Ridge. The officers of the new company are: Thos. H. Warren, president; Geo. T. Weigart, vice-president; W. F. Perrin, secretary, and W. H. Cox, Jr., secretary. The headquarters of the new concern are at 306 Union street, Nashville, Tenn. The plants comprised in the organization have a total combined daily production of 1500 bbl., which will give them one of the largest productions in the South. The plants are all located on the Louisville and Nashville, and Nashville, Chattanooga, and St. Louis railroads, two main trunk lines, that give them excellent shipping facilities. They are also in the blue grass limestone region of Tennessee, with an abundance of raw material for the manufacture of high-grade lime. The new company will ship to points in Indiana, Ohio, Kentucky, Tennessee, Georgia, Florida, Alabama, Mississippi, and Louisiana. Plans of the Southland company include a considerable amount of plant improvement and better methods of distribution.

Beaver Cement Plans Addition to Oregon Mill

DEMAND for cement for building construction and highway purposes is growing so rapidly in the West, according to D. L. Carpenter, president of the Beaver Portland Cement Co. of Portland and Gold Hill, Ore., that immediate enlargement of the company's plant and holdings will be made. Properties and plant of the concern at Gold Hill and its deposits of shale and limestone in southern Oregon are valued in excess of $1,500,000 and annual earnings are said to average in excess of $121,000.

The company controls many high-grade limestone deposits in southern Oregon and its proven holdings are already sufficient to supply a mill of 1000-bbl. daily capacity for a long time. Adjoining the Gold Hill mill are its shale deposits, and its limestone quarry is at Marble mountain, 32 miles distant. It also controls limestone deposits at Colvig, Gulch, Zacher, Deer Creek and at Kerby.

The influx of population into the Pacific coast, the extension of highways, harbor construction activities and similar enterprises are creating such a heavy demand for cement that the company finds it necessary to anticipate future demands.—*Portland (Ore.) Journal.*

New Cement Plant for Australia

A. J. SWAN, president of the Standard Cement Co. of Sydney, N. S. W. Australia, is in the United States at the present time purchasing material and equipment for the plant which his company is erecting in the district north of Sydney in which the Kandos and the Commonwealth Cement Companies are already operating. This district contains coal shale and limestone so placed that the cement manufacturers can obtain everything needed for the making of cement, including the fuel, near the works.

The new plant will have an output of 2000 bbl. per day and provision has been made in the design to bring the production up to 12,000 bbl. Shale and coal are to be mined directly at the plant. Limestone is to be brought in over an aerial tramway from a quarry which is three miles distant. The company is already in the coal business and produces coal for the government railways and several private consumers including cement companies.

The plant will use the dry process as both limestone and shale are uniform in quality. Waste heat boilers will supply the power for the whole operation. The kilns will be fired by pulverized coal, which is to be pulverized without drying and blown directly from the pulverizer to the kiln.

The machinery for the plant was mainly furnished by the Edgar Allen Co. of Sheffield, England. The larger motors were made by the Pebles company of Edinburgh, Scotland, and the turbo-generators by the British Thompson-Houston Co The other electrical apparatus, such as switch boards and transformers, was made by the General Electric Co. and the smaller motors are all of Australian make.

Mr. Swan is connected with a number of rock products enterprises in Australia.

Suit for Blast Damages

ACTION against the Arundel Corp. of Baltimore, Md., has been filed by Joseph Bancroft & Sons Co. of Baltimore, who seek to obtain a preliminary injunction of operation to be issued on the Arundel company.

The complainant, represented by William S. Hilles, sets forth that on March 28, 1923, it leased to the Arundel Corp. a rock deposit on its property in Brandywine hundred, opposite the plant of the Bancroft Co.

According to the bill, the lease proved that the Arundel corporation would use due care and caution in conducting blasting operations on the premises so as not to throw stones, spalls or other matter upon the property retained by the complainant. The Arundel Corp., it is contended, was to reimburse the Bancroft Co. for loss or damage occasioned by the throwing of rocks or other matter.

The Arundel Corp., it is maintained, sublet the quarry to the Hubbert Co. on February 9, 1924. It is claimed the Arundel Co. was still bound, however, by the provisions of the lease covering the exercise of care and caution and the payment of damages.

Considerable damage, it is contended, has been caused the buildings of the Bancroft Co. in spite of the provisions of the lease, and it is said, one employe has been seriously injured by flying rocks.

The Bancroft Co. seeks to have the operators of the quarry restrained by injunction from throwing by blasts or permitting to be thrown, any rocks or stones upon its property.—*Wilmington (Del.) Journal.*

New Los Angeles Ordinance Requires Weighing of Sand, Rock and Gravel

AN ORDINANCE requiring all rock, sand and gravel transported over streets in the city of Los Angeles to be weighed by a public weighmaster authorized under the state law has been passed by the city council and signed by the mayor, according to the *Southwest Builder and Contractor*. The ordinance went into effect on November 19.

While the ordinance was drafted in the city attorney's office the city's legal advisor will not be surprised if its validity is attacked in the courts. It is predicated on the theory that rock, sand and gravel are being sold by weight. However, the city has never attempted to regulate the manner in which these commodities may be sold, and Assistant Attorney McFadden, who drafted the ordinance, states that while a weight certificate is required, dealers may sell rock, sand and gravel by bulk if they choose.

When this ordinance was first introduced in council it was referred to the committee on traffic and lighting on the supposition that it was a traffic measure. It was proposed by the committee that the ordinance be made to apply to lumber, cement and steel and iron casing as well as rock, sand and gravel, but the city attorney's office advised that if it was made a traffic regulation it would have to be applied to all vehicles, regardless of what was carried.

Under the state law providing for public weighmasters, the rock, sand and gravel companies may secure a license for any employe to act in this capacity under a bond of $1000. Certificates of weight signed by the weighmaster must be impressed with a seal which is similar to a notary's seal.

According to the county sealer of weights and measures acting under the state department, rock, sand and gravel companies may put in scales at their plants or may use the public weighing stations on the boulevards. Enforcement of the ordinance will be entirely in the hands of the city, however.

Following is the text of the new ordinance as passed by council (No. 52,999):

Section 1. Every person, firm or corporation engaged in the business of selling sand, rock or gravel in the city of Los Angeles, shall furnish to the purchaser thereof, with each load of said above mentioned materials, a state certificate of weights and measures issued by a public weighmaster authorized under the laws of the state of California to issue such certificate.

Section 2. It shall be unlawful for any person, firm or corporation to transport, haul or carry sand, rock or gravel upon any public street or way within said city unless each load thereof is accompanied by a state certificate of weights and measures provided for in Section 1 thereof.

Provided, however, that nothing in this ordinance contained shall be deemed or construed to require loads of sand, rock or gravel to be accompanied by such weight certificates when such loads are in transit from and to points outside of said city.

Section 3. Each such certificate required under the provisions of this ordinance shall show thereon, in addition to such other information as is or may be required by law, the gross weight of such load together with the vehicle transporting or containing the same, also the weight of such vehicle, and the net weight of such load of sand, rock or gravel being so sold, transported, hauled or carried.

In case such vehicle contains or transports more than one kind of the aforementioned materials, said certificate shall show the net weight of each kind of said materials being sold, transported, hauled or carried.

Section 4. Any person, firm or corporation violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punishable for the first offense by a fine of not to exceed fifty ($50.00) dollars, or by imprisonment in the city jail for a period of not to exceed five (5) days, or both such fine and imprisonment; for a second offense within a period of one (1) year thereafter, by a fine of not to exceed one hundred ($100.00) dollars, or by imprisonment in the city jail for a period of not to exceed ten (10) days, or both such fine and imprisonment; and for each additional offense within said one year after conviction for said first offense, by a fine not to exceed five hundred ($500.00) dollars, or by imprisonment in the city jail for a period of not to exceed six (6) months, or by both such fine and imprisonment.

Greenville Gravel Company and Subsidiaries Combine

WE are officially informed by Guy C. Baker, vice-president of the Greenville Gravel Co., to the effect that a complete merger has been effected of the Greenville Gravel Co. of Greenville, Ohio, and all of its subsidiary interests. In order to accomplish this end, more than a year has been required to work out details and to comply with all the legal formalities.

The new merger will be known as the Greenville Gravel Corporation. The merger includes the Greenville Gravel Co., Detroit-Greenville Gravel Co., Kalamazoo-Greenville Gravel Co., Logansport-Greenville Gravel Co., Richmond-Greenville Gravel Co., Urbana-Greenville Gravel Co., Massillon-Greenville Gravel Co., the Greenville Manufacturing Co. and the Allied Belting Co.

The capitalization of the Greenville Gravel Corporation is $3,750,000.00 and its officers are as follows:

F. D. Coppock, president and general manager; C. E. Patty, vice-president and assistant general manager. Guy C. Baker, vice-president and sales manager; H. R. Brown, secretary-treasurer.

The board of directors of the new company consists of F. D. Coppock, C. E. Patty, Guy C. Baker, Joe F. Coppock, H. R. Brown, Jos. C. Patty, D. L. Gaskill, W. S. Meeker and Adelbert Martz.

The main office of the company will, for the present, remain in Greenville.

The company has just finished the biggest year's business of its 22 years of gravel experience.

A Move for Cleaner Cars for Shipping Sand, Gravel and Stone

UNDER date of November 11, the Midwest Regional Advisory Board has issued the following letter directed to all shippers of sand, gravel, and stone:

From time to time consideration has been given to the condition of open-top cars, furnished for the transportation of sand, gravel, and crushed stone, with a view to securing from railroads, cleaner cars, thereby saving the producer the cost of cleaning cars, and eliminating the detention incident to the delay involved in the cleaning of cars.

Following conferences between committees representing this board and the railroads, it has been agreed that as a practicable proposition the first step in securing relief from the existing situation will be to require consignees to completely unload cars, and to remove any blocking, bracing, or debris used in connection with, or resulting from, the lading. Railroads have demonstrated their sincerity in attempting to cope with this situation but require assistance.

To accomplish that end it has been agreed that if consignees will make a written report, in detail, to the proper transportation officer, i.e., Superintendent of Transportation, or Superintendent of Car Service, of the railroad furnishing cars, showing specifically the initial, car number, date and nature of the debris in all cars tendered for loading, making them unsuitable for use in transporting your produce, the matter will be taken up with the last consignee, and an attempt made to correct the situation. In making such written report please mail a carbon copy to the undersigned.

Assurance of your support and cooperation in this matter will be greatly appreciated.

W. J. Womer,
Chairman, Committee on Complete Car Unloading.

California Gravel Plant To Be Improved

IMPROVEMENTS costing $40,000 will be made at the Independent Sand and Gravel Co. plant at Forestville, Calif., within the next year, while plans are now being made for the construction of a branch receiving yard and sales office in Santa Rosa, it was announced by Fred Allmers, general manager of the company. Negotiations for a Santa Rosa site are now under way.

The company's gravel pit is located on the Russian river on the Summer Park road, where an electric pontoon suction dredger is in operation. Pea gravel from this pit, used in modern highway construction, is being distributed through many Western states.—*Santa Rosa (Calif.) Press-Democrat.*

South Dakota State Cement Plant Called a Losing Proposition

Whether It Is or Not Is Has Become a Football of Politics and Therefore Can Not Be Efficiently Operated

HISTORY is repeating itself. South Dakota is beginning to wake up to facts that have been learned elsewhere over and over again. A state government with constantly changing personnel and policies can't run a business efficiently. The newspapers all through South Dakota recently carried this Associated Press story:

The Pierre *Capital-Journal* publishes a story today saying that it has obtained information which shows that the state cement plant at Rapid City will show a still greater deficit on January 1, 1926, than that estimated by Verne C. Kennedy, a candidate for governor, in a recent address at Sioux Falls.

While Mr. Kennedy placed the deficit at $200,000, excluding the sinking fund, the *Capital-Journal* says the loss, on the basis of its figures, will be $211,774.17.

"This figure is approximated," the newspaper says, "since it includes interest upon the bonds and appropriation for the plant, and depreciation upon the construction costs for the entire year of 1925, instead of ten months and 22 days; but it does not include another item of $115,882.52 which would properly be charged against the plant for sinking fund purposes if the plant is to retire its own bonds and pay for itself, instead of being paid for by the taxpayers of the state. Otherwise, the loss of $211,774.36 is accurate, according to the quarterly audits of the plant, as filed with the secretary of state.

Details Figures

"The report up to January 7, 1925, shows that the plant on that date had on hand bag and tag stock amounting to $76,023.03; cash on hand $10,559.03; a balance with the state treasurer of $44,678.83 and a payroll account of $617.28, a total of $131,878.17. Against this the plant had accounts receivable and accounts payable, but it is estimated that the accounts payable did not exceed accounts receivable by more than $50,000, and this figure is taken for the purpose of calculation. This gives a balance of $81,878.17 with which the plant started the year on January 7, 1925. Subsequently the plant received an appropriation of $275,000, making a total of $356,878.17 to be accounted for in the operation of the plant.

"The daily report of the plant for October 22, 1925, as made to the governor by E. C. Thorpe, manager of the plant, shows that on that date the commission had on hand in the Pennington County Bank $24,377.16, in closed banks $11,435.27; in the hands of the state treasurer $123,995.10, and an unexpended balance remaining from the $275,000 appropriation of $175,000. In addition it had accounts receivable of $37,130.60, making a total of $371,638.03, from which must be subtracted accounts payable, $3,721.41, leaving a balance of $367,916.62 as cash items in the hands of the commission.

"In addition, on October 22, the daily report shows, the commission had 66,207 bbl. of cement in storage, which figured at 85 cents a barrel amounts to $56,275.95.

Plant's Assets $424,192.57

"Adding the value of the cement in storage to the cash items gives a total of $424,192.57 as the total assets of the plant on October 22. Deducting from this the assets shown on January 7, gives the plant an apparent operating profit of $67,314.40 for the period.

"Against this, however, must be charged interest at 5% on $2,038,575.18 worth of bonds, $4,075.41 bank interest, and interest on the $275,000 appropriation, which amounts to $115,882.53 for the entire year. Deducting the apparent operating profit of $67,314.40 from this interest charge leaves a loss of $48,568.12. To this must be added a loss from depreceiation, which, figured at 8% on the original cost of the plant, amounts to $163,206.24, giving a total loss from the operation of the plant of $211,774.36.

"There are several items which have not entered into this calculation, as the figures are not available, such as bags on hand on October 22 and liability for bags outstanding there is a potential liability against the plant of about $65,000, but it is possible that the plant has on hand bags worth $65,000 so this figure is not included in the calculation.

No Sinking Fund Charged

"An additional charge of $115,882.53 would have to be made against the plant if a sinking fund of 5% were to be set aside to return the invested capital at the end of 20 years."

Kennedy Interviewed

Sioux Falls, S. D.—Verne C. Kennedy, here today on business, declared that the Pierre *Capital-Journal's* investigation of the cement plant bore out his statements and revealed him as "ultra-conservative."

"The *Capital-Journal's* investigation proves that Governor Gunderson is either mistaken or that he has deliberately attempted to mislead the public," Mr. Kennedy said, "when he states that the cement plant has been operated at sufficient profit this year to pay all operating charges together with the interest and depreciation on the plant."

Raps Gunderson

Recalling that the governor has declared he receives daily reports from the cement plant and has an intimate knowledge of its operations and financial conditions, Mr. Kennedy added:

"If this be true there would appear to be scant excuse for ignorance in a matter involving hundreds of thousands of dollars. The only conclusion to be arrived at is that he has intentionally made statements which the true conditions would not substantiate."

Mr. Kennedy said he would continue to adhere to the "same scrupulous honesty" in presenting facts about the state's businesses during his campaign for governor.

Of course, this is all part of an election campaign; but this very fact is enough to demonstrate the futility of a state government indulging in an industrial enterprise.

Some Applied Common Sense

Commenting editorially on the above, the Pierre (S. D.) *Journal*, which unearthed the data, says, in part:

There can be no doubt about the loyalty of the dealers and the people of the state this year in the use of the home product. In addition to the normal consumption there has been a considerable amount of cement used on the construction of the Pierre bridge, which will not be used every year. It is not our purpose to find fault with the administration because the cement plant is not paying, but we do believe the people should keep in touch with the actual conditions and that the law requiring a quarterly audit should be made regularly and published for the benefit of the taxpayers. So long as we have the one session of the legislature only once in two years, the people have no representative means of dealing with this system of government except long range shots. The deductions, therefore, must be made by the press if the people are to know what is going on. It is, of course, only proper that a depreciation charge should be included in operating costs. As to the amount of this charge, authorities may differ. But no matter how we look at this cement proposition, it is an actual fact that with operating as it has been, the taxpayers will have to dig down in their pockets to make up a deficiency.

* * * * * * *

Just now the taxpayers are faced with a pretty general line of losing so far as state administration is concerned. There is bound to be a loss in gasoline tanks and equipment. There is seemingly an awful loss in the rural credits. It is know there is more than a million dollars shortage in the general fund. Then there is the loss in the hail insurance department and according to the absolute figures, there is a loss going on in the cement plant operation. The coal mine will be conceded to be holding its own until such time as someone can show a different situation. This is not a good prospect for Mr. Taxpayer. It is going to take a lot of nerve and in fact more nerve than anyone who has held a job of governor, to bring the people to a full realization of the diminishing resources which confront the state so far as its revenues are concerned. There is no need of becoming hysterical about the situation, but if the state is going into so much business, it needs to change its legislative system so that the representatives of the people can keep in closer touch with state affairs.

Dixie Has Good "No-Accident" Record

THE Dixie Portland Cement Co., has a model safety organization at its plant at Richard City, Tenn. As proof of it, the company shows that its quarry has operated since September 10, 1924, without a single no-lost-time-accident. If they continue as fortunate until this issue of ROCK PRODUCTS goes to press, this record "run" will have totaled 445 days. W. E. Keener is quarry superintendent.

The total lost time for 1925, to date, for the whole plant, is 6.54 days (per 100,000 man hours).

Portland Cement Output for October

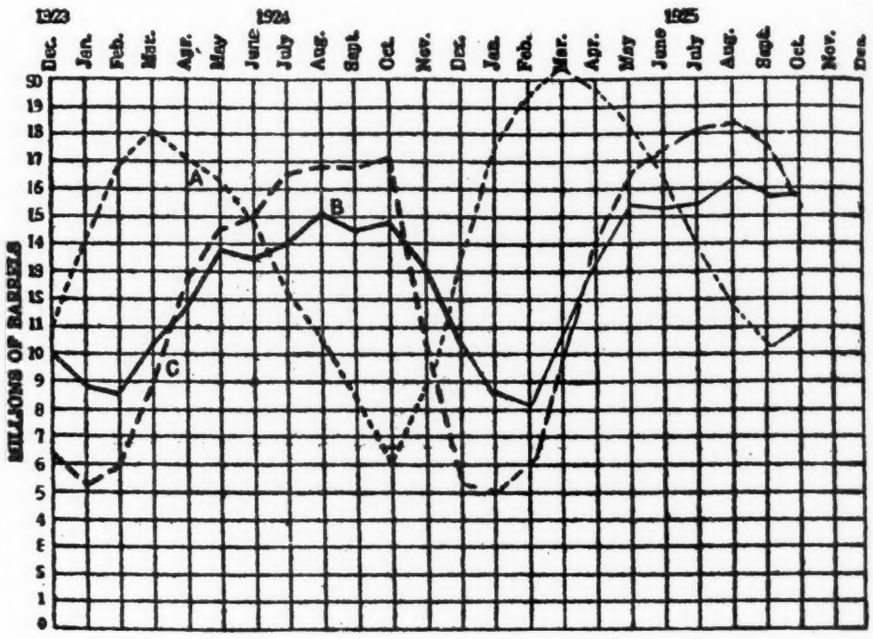
Shipments for Month Total 15,309,000 Barrels

PRODUCTION of portland cement in October is second only to that of August, 1925, and shows an increase of nearly 8% over October, 1924, according to statistics compiled by the Bureau of Mines, Department of Commerce. The seasonal decline in the shipments of portland cement is shown by a decrease of 2,402,000 bbl. in October as compared with September, 1925. This downward trend has begun one month earlier than in 1924. Stocks of portland cement are 80% greater than on October 31, 1924. The following tables prepared by the Division of Mineral Resources and Statistics of the Bureau of Mines are based mainly on the reports of producers of portland cement. The October, 1925, totals include estimates for one plant.

Clinker Stocks

Stocks of clinker, or unground cement, at the mills at the end of October, 1925, amounted to about 4,082,000 bbl. compared with 4,561,000 bbl. (revised) at the beginning of the month.

An estimate of the unground clinker by months is given in the last table.



(A) Stocks of portland cement at factories. (B) Production of finished portland cement. (C) Shipment of finished portland cement from factories

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES, IN AUGUST AND SEPTEMBER, 1924 AND 1925, IN BARRELS*

Shipped—	August, 1924	August, 1925	September, 1924	September, 1925
Alabama	185,494	277,605	167,959	192,882
Alaska	1,053	264	1,846	455
Arizona	32,615	33,328	39,176	34,380
Arkansas	139,515	88,143	114,134	54,377
California	960,221	1,154,523	936,834	1,120,092
Colorado	174,924	118,335	150,865	122,128
Connecticut	179,012	194,911†	193,380	232,265
Delaware	49,501	50,949	52,272	63,024
District of Columbia	80,080	83,155	79,399	84,260
Florida	198,827	310,457	220,021	522,465
Georgia	134,819	136,542	151,930	134,340
Hawaii	1,842	1,108	2,076	3,511
Idaho	28,042	31,846	30,221	24,959
Illinois	1,404,542	1,790,148	1,584,579	1,658,700
Indiana	781,376	690,624	764,188	625,962
Iowa	357,329	375,407	461,405	368,763
Kansas	228,297	254,074	228,064	205,607
Kentucky	203,792	220,859	222,361	196,628
Louisiana	104,683	105,440	116,770	80,907
Maine	48,807	37,277†	41,945	40,051
Maryland	256,498	235,983	230,946	260,019
Massachusetts	369,062	356,341†	364,320	326,615
Michigan	1,252,561	1,194,934	1,263,113	1,195,566
Minnesota	392,542	472,018	397,268	455,011
Mississippi	60,512	70,141	59,499	56,979
Missouri	435,736	723,916	501,596	597,568
Montana	26,332	31,638	24,935	24,598
Nebraska	178,020	210,305	204,610	206,703
Nevada	9,847	12,635	12,815	10,598
New Hampshire	46,592	52,941	37,872	48,675
New Jersey	712,602	653,685	756,579	809,251
New Mexico	24,153	17,246	29,306	12,945
New York	1,966,885	2,151,191†	1,953,647	2,006,604
North Carolina	383,174	340,027	295,252	354,835
North Dakota	33,148	37,735	24,990	33,458
Ohio	1,164,939	1,212,138	1,059,982	1,118,150
Oklahoma	193,464	286,912	185,550	195,542
Oregon	153,691	157,360	141,492	157,333
Pennsylvania	1,737,633	1,852,731†	1,672,054	1,937,173
Porto Rico	0	0	0	346
Rhode Island	63,326	71,369†	70,196	71,846
South Carolina	50,890	92,255	52,416	82,742
South Dakota	53,360	57,380	60,159	56,838
Tennessee	176,909	193,279	196,000	171,080
Texas	379,845	404,161	308,305	328,962
Utah	41,539	45,985	47,993	44,564
Vermont	46,512	23,698	36,842	28,794
Virginia	189,686	176,842	184,713	184,071
Washington	208,254	323,325	175,169	258,182
West Virginia	207,811	177,994	191,320	201,698
Wisconsin	551,562	626,004	603,204	513,479
Wyoming	46,597	31,042	38,828	20,461
Unspecified	73,614	10,520†	37,101	74,427
	16,782,067	18,258,726	16,777,497	17,610,869
Foreign countries	72,933	124,274	49,503	100,131
Total shipped from cement plants	16,855,000	18,383,000	16,827,000	17,711,000

*Includes estimated distribution of shipments from three plants in August and September, 1925, and from four plants in August and September, 1924.
†Revised.

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII, AND PORTO RICO IN SEPTEMBER, 1925*

	Barrels	Value
Alaska	1,387	$4,270
Hawaii	2,370	5,431
Porto Rico	16,440	38,325
	20,197	$48,026

*Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision. †Imports and exports in October, 1925, not available.

IMPORTS AND EXPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1924 AND 1925

Month	Imports 1924 Barrels	Imports 1924 Value	Imports 1925 Barrels	Imports 1925 Value	Exports 1924 Barrels	Exports 1924 Value	Exports 1925 Barrels	Exports 1925 Value
January	153,839	$250,799	229,838	$361,098	88,586	$252,497	71,596	$207,547
February	162,930	219,588	119,077	206,308	62,606	194,110	56,249	181,356
March	160,517	254,745	218,054	374,839	91,224	254,687	65,248	200,410
April	148,137	227,300	197,686	280,826	83,200	229,183	89,508	263,831
May	161,304	232,950	186,897	286,959	88,850	262,290	85,385	250,845
June	196,655	283,112	254,937	409,539	74,064	229,852	71,343	217,899
July	108,944	181,111	335,118	499,602	60,139	186,073	98,141	286,543
August	192,634	305,690	380,568	611,551	85,883	251,904	103,961	289,904
September	138,369	232,991	513,258	789,152	69,470	206,921	102,649	285,225
October	214,987	337,199	(†)	(†)	79,180	253,479	(†)	(†)
November	198,806	305,598	.....	.....	42,490	130,519	.....	.....
December	173,814	285,481	.....	.....	52,851	163,639	.....	.....
	$2,010,936	$3,116,564	.....	.....	878,543	$2,615,154	.....	.....

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN OCTOBER, 1924 AND 1925, AND STOCKS IN SEPTEMBER, 1925, IN BARRELS

Commercial District	Production. October, 1924	Production. October, 1925	Shipments, October, 1924	Shipments, October, 1925	Stocks at end of October, 1924	Stocks at end of October, 1925	Stocks at end of Sept., 1925*
E'n Penn., N. J. & Md...	3,598,000	3,851,000	4,298,000	4,108,000	677,000	791,000	1,048,000
New York	809,000	916,000	983,000	977,000	379,000	405,000	465,000
Ohio, W'n Penn. & W. Va.	1,495,000	1,700,000	1,919,000	1,432,000	472,000	1,499,000	1,232,000
Michigan	1,080,000	1,171,000	1,132,000	1,062,000	282,000	825,000	716,000
Wis.,† Ill., Ind. & Ky.	2,229,000	2,339,000	2,660,000	2,014,000	436,000	2,153,000	1,828,000
Va., Tenn., Ala. & Ga.	1,115,000	1,254,000	1,185,000	1,236,000	290,000	289,000	271,000
E'n Mo., Ia., Minn. & S. Dak.‡	1,518,000	1,515,000	1,763,000	1,434,000	1,502,000	1,971,000	1,890,000
W'n Mo., Neb., Kans. & Okla.	985,000	992,000	1,220,000	972,000	872,000	1,518,000	1,498,000
Texas	415,000	429,000	407,000	335,000	215,000	382,000	288,000
Colo. & Utah	275,000	212,000	278,000	179,000	181,000	399,000	366,000
California	1,062,000	1,189,000	1,036,000	1,201,000	364,000	439,000	451,000
Ore., Wash. & Mont.	239,000	424,000	279,000	359,000	403,000	259,000	194,000
	14,820,000	15,992,000	17,160,000	15,309,000	6,073,000	10,930,000	10,247,000

*Revised. †Began producing June, 1924. ‡Began producing December, 1924, and shipping January, 1925.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1924 AND 1925, IN BARRELS

Month	Production 1924	Production 1925	Shipments 1924	Shipments 1925	Stocks at end of month 1924	Stocks at end of month 1925
January	8,788,000	8,856,000	5,210,000	5,162,000	14,155,000	17,656,000
February	8,588,000	8,255,000	5,933,000	6,015,000	16,815,000	19,689,000
March	10,370,000	11,034,000	8,995,000	10,279,000	18,189,000	20,469,000
First quarter	27,746,000	28,145,000	20,138,000	21,456,000		
April	11,726,000	13,807,000	12,771,000	14,394,000	17,159,000	19,877,000
May	13,777,000	15,503,000	14,551,000	16,735,000	16,403,000	18,440,000
June	13,538,000	15,387,000	15,036,000	17,501,000	14,903,000	16,409,000
Second quarter	39,041,000	44,697,000	42,358,000	48,630,000		
July	14,029,000	15,641,000	16,614,000	18,131,000	12,319,000	13,896,000
August	15,128,000	16,419,000	16,855,000	18,383,000	10,666,000	11,952,000
September	14,519,000	15,939,000	16,827,000	17,711,000	8,404,000	*10,247,000
Third quarter	43,676,000	47,999,000	50,296,000	54,225,000		
October	14,820,000	15,992,000	17,160,000	15,309,000	6,073,000	10,930,000
November	13,141,000		10,289,000		8,928,000	
December	10,435,000		5,506,000		13,913,000	
Fourth quarter	38,396,000		32,955,000			
	148,859,000		145,747,000			

*Revised.

IMPORTS AND EXPORTS*

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN SEPTEMBER, 1925

Imported from—	District into which imported	Barrels	Value
Belgium	Massachusetts	4,641	$6,597
	Philadelphia	22,203	32,388
	South Carolina	4,498	6,390
	Florida	79,389	118,502
	New Orleans	11,980	17,057
	Los Angeles	33,916	40,338
	San Francisco	11,909	15,794
	Oregon	9,002	11,612
	Washington	19,868	42,858
	Total	197,406	291,536
Canada	Maine and New Hampshire	435	688
	Vermont	18,265	25,751
	Saint Lawrence	106,996	167,073
	Buffalo	4,611	7,074
	Florida	102,808	146,820
	Total	233,115	347,406
Cuba	Florida	6	31
Denmark	Porto Rico	23,532	22,962
Esthonia	Hawaii	33,689	82,830
France	New York	2,264	4,562
	San Francisco	2,758	1,079
	Total	5,022	5,641
Germany	New Orleans	1,531	1,507
Greece	New York	.....	3
Japan	Hawaii	1,519	2,750
Norway	Maine and New Hampshire	3,992	6,376
	Massachusetts	12,999	26,650
	Total	16,991	33,026
United Kingdom	Los Angeles	447	1,460
	Grand Total	513,258	789,152

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES, IN SEPTEMBER, 1925

Exported to—	Barrels	Value
Canada	1,987	$ 7,392
Cuba	43,022	97,167
Other West Indies	11,558	26,378
Mexico	14,029	36,373
Central America	3,992	12,493
South America	22,453	73,007
Other Countries	5,608	32,415
	102,649	$285,225

ESTIMATED CLINKER (UNGROUND CEMENT) AT THE MILLS AT END OF EACH MONTH, 1924 AND 1925, IN BARRELS

Month	1924	1925
January	5,458,000	7,017,000
February	6,905,000	8,497,000
March	8,271,000	9,962,000
April	8,545,000	9,731,000
May	8,225,000	9,053,000
June	7,609,000	7,937,000
July	6,646,000	6,961,000
August	5,367,000	5,640,000
September	4,260,000	4,561,000*
October	3,548,000	4,082,000
November	4,025,000	.....
December	5,433,000	.....

*Revised.

Plans Florida Cement Plant

THE final negotiations were recently completed for the proposed $4,000,000 Florida Portland Cement Co. plant at Tampa, Fla. Work of erection is expected to start within a short time and the plant operation to begin about December, 1926. The development of this project was in conjunction with the industrial department of the Seaboard Air Line. The plant will be erected by Cowham Engineering Co. of Chicago, whose president, John L. Senior, will also be president of the new cement company.

The plant will be located at Hooker's Point and by a deep water harbor, assuring the water shipment of cement to other ports. The company has about 600 acres of limestone and clay lands near the proposed plant said to contain sufficient material to maintain a 2,000,000 bbl. per year plant for a long period. Plans call for the installation of three rotary kilns, 11x175 ft., waste-heat boilers and dust collectors. The initial production will be abou 1,500,000 bbl. per year but provisions in plant arrangement will allow the further installation of additional equipment for increasing production to 2,500,000 bbl.

John L. Senior, who is to be the president of the company, has had a wide experience in the cement industry and is at present the president of the Signal Mountain Portland Cement Co. of Chattanooga, Tenn., and Peninsular Portland Cement Co. of Chicago, Ill., and a director of the Trinity Portland Cement Co. and the Peerless Portland Cement Co.

Dexter Portland Cement Purchases Penn-Allen

THE Dexter Portland Cement Co., Nazareth, Penn., has acquired the property and business of the Penn-Allen Portland Cement Co., Penn-Allen, near Nazareth, including mill and quarries. The new owner will make extensions and improvements in equipment installation to increase the present output.

Florida Lime Rock Association Formed

Rock Producers Organize to Fight Freight Embargo

WITH a view towards getting relief from the present embargo situation, which has so completely paralyzed the limestone industry, thereby affecting not only the properties but a large group of employees, mercantile establishments, etc., the Florida Lime Rock Association was organized recently at Ocala, Fla.

Representatives of the leading companies in Marion county, some of which have similar interests in neighboring counties, met at the Harrington Hall hotel, where the organization meeting was held. At the time of the call it was not known the exact turn that would be taken but it was the unanimous sentiment of those present that the course ultimately decided upon was the only one to be taken under the existing conditions. Aside from the helpfulness that will inevitably result from such an allied group and frequent meetings, the principal thing on which entire effort and thought will center for the present is getting relief from the railroads traversing this territory and connecting lines throughout the state.

The organization will make strenuous effort towards securing aid from the present freight embargo, and to take every possible step towards producing and shipping lime stone for the building of roads, which is so exceedingly essential for the state's continued growth and expansion, as well as for the employment of a vast amount of labor.

The officers elected follow: W. M. Palmer, Ocala, president; E. F. Fitch, Jacksonville, vice-president; Chas. H. Lloyd, Jacksonville, vice-president; Carl G. Rose, Ocala, treasurer, and Virgil H. Lanier, Jacksonville, secretary.

Telegrams were sent to the various railroads as follows:

"We wish to advise you of the formation at Ocala of the Florida Lime Rock Association and with membership including every producer of lime rock in the state. All quarries now closed down due to your general embargo and we are without definite information as to when embargo on lime rock is to be raised and resumption of shipments permitted. Meantime we are maintaining a complete organization at heavy expense and we feel that we are entitled to definite and immediate information as to your plans in connection with our industry. Please address reply to

"Florida Lime Rock Association,
"(Signed) W. M. Palmer, E. F. Fitch, C. H. Lloyd, C. G. Rose, Executive Committee."

The following companies were represented as follows: Florida Shell Rock Co., E. A. Osborne and Baxter Morrison; Williston Lime Rock Co., and Williston White Rock Co., Dawson White; Cummer Lumber Co., C. H. Lloyd; Williston Shell Rock Co., Claud Rooks; Commercial Lime Co., and Dixie Lime Products Co., W. M. Palmer, J. H. Williams and Virgil H. Lanier; Connel & Schultz, C. D. Schultz and J. T. Connel; Crystal River Rock Co., C. G. Ware, J. Y. Clark and L. Abbott; Marion County Lime Co., E. F. Fitch and Jack Camp; Ocala Lime Rock Co., Carl G. Rose, W. N. Horne and H. G. Little; Pineola Rock Co., C. W. Hunter, T. A. Thompson.

Ocala and Marion county are particularly interested in this aggressive movement on the part of the lime producers and trust their efforts will be reasonably effective and that at an early date. Future developments will be awaited with more than the usual interest.—*Ocala (Fla.) Star.*

Governor of Missouri Would Tax All Mineral Products for School Fund

A COMMUNICATION said to be from Governor Baker of Missouri and published in certain Missouri papers proposes a number of changes in the tax law, to raise more money for school purposes. Among these is a proposal for a tax on all mineral products including rock used for crushed stone, lime and cement making and on sand and gravel. This section of the law reads:

A severance tax on all minerals extracted from the earth. This tax is proposed to be not less than one per centum nor more than two per centum of the cash value of all minerals, mineral deposits and ores, including lead, zinc, coal, iron, sand, gravel, stone products, marble, granite, oil, gas, Fuller's earth, and other commercial clays, and all other minerals whatsoever, which are mined, quarried, taken or severed from any land or lands, or from the bed of any water force within the state of Missouri for mineral purposes. Said tax shall be levied upon the gross value of such minerals at the place where produced and collected from the producer at such times and in such manner as shall be provided by the General Assembly. This severance tax it is proposed shall be and stand in lieu of any general property tax upon any of such severed minerals.

Cause of Fire at France Stone Company's Monroe Plant

THE France Stone Co. of Toledo, Ohio, lost its plant at Monroe, Mich., by fire on October 18, as noted in the October 31 issue of ROCK PRODUCTS. D. C. Souder, director of insurance and safety, has written as to the cause of the fire. It might easily happen, with an ordinary snap switch, that one man would turn off an electric heater, and another, who followed him, would turn it on, thinking he was turning it off, as is surmised was done in this case. A knife blade switch or some other form which would show definitely whether the current was on or off would seem to be the proper switch to use in such cases.

A part of Mr. Souder's letter follows:

"It is our belief that the fire started in an electric heater that was used in the lower mill near a 250-h.p. motor. This heater was used during cold weather for heating lubricating oils and greases so they would flow more freely when applied to various machinery in the mill.

"A peculiar happening took place in regard to the electric heater. It was the custom of our mill men to turn off the heater every night before leaving the premises. After the fire, the writer made a careful investigation and found two men in our employ, each stating that he had turned off the electric heater. From this information, it is the writer's belief that one employe turned off the heater and the other turned it on. This took place about 5:40 p.m. Saturday and fire broke out about 3:00 a.m. Sunday morning.

"Our loss was in the neighborhood of $220,000 and was fully covered by insurance, and it is our intentions to rebuild the plant this winter."

Essay Contest of American Road Builders' Association

THE American Road Builders' Association is offering $550 in prizes for the best essay on "A New Nation by Improved Highways." The contest is open to all college students and will consist of an essay not exceeding 600 words.

Graham Brothers Building New Bunkers at San Pedro

CONSTRUCTION of an unloading and distributing plant at San Pedro by Graham Brothers Co. of Long Beach, Calif., is under way and the plant is expected to be in operation within a short time.

The harbor district, including San Pedro, Wilmington, Lomita, Torrance, Harbor City, Redondo and Hawthorne, will be served by this new plant, which will be known as the Los Angeles harbor plant. It will provide bunkers with a capacity of 500 cu. yd., as well as unloading equipment.

There will be facilities for a stock pile of 5000 cu. yd. Catalina rock coming in from the island quarry will be delivered to places further west directly from this plant, rock barges unloading there. This plan will cut down time of delivery of rock to consumers. The work is being done by the Graham Brothers' own construction department.—*Long Beach (Calif.) Sun.*

Cement Products

Scientific Methods Used in Making Concrete Block

Ideal Cement Stone Co., of Omaha, Nebraska Has Employed Research Man to Find the Best Aggregate Grading and Has Improved Its Block Machines

IN Omaha the cement products business has been developed to a point away beyond what some larger cities can show. Two companies operate plants that will stand comparison with those of any city. The largest of these is the Ideal Cement Stone Co., which has a plant at 31st and Spaulding streets and another in South Omaha. Both plants have the same capacity, which is 5000 blocks per day.

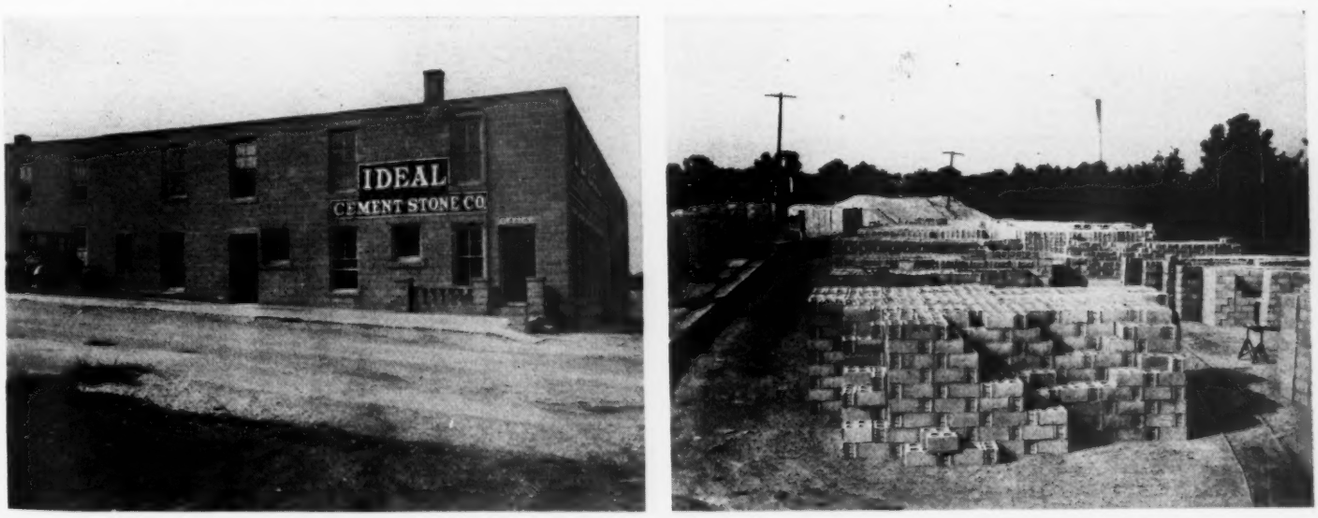
One finds the products business developed where there is an abundance of good aggregate, and this is supplied in Omaha by the Lyman-Richey Sand and Gravel Co. The greater part of this company's output is what it calls sand-gravel. For concrete products this is graded to meet specifications which were drawn up as the result of an investigation made for the principal products making companies by a concrete engineer. The grading is such that the aggregate has a modulus of fineness of 4.25 and this has been found to make a block that would pass the high strength test required by the Omaha building code (1000 lb. to the square inch) with the minimum of cement.

With equal care the company has studied the other details of manufacture. It was found that the standard block machines installed could be improved by changing the form of the tamper and this was done, although the change necessitated the designing and building of a stronger base.

The method of manufacture is simple. The aggregate is received in a hopper at the back of a line of Blystone mixers. It is measured into the mixers, cement is added and the two are given three minutes dry mix. Then water is turned in through sprinkling pipes and a one minute wet mix is given. This procedure is the result of considerable experimenting to find the best method of mixing and the time which would give the best concrete. The concrete is discharged through a door in the mixer which has been added since the mixer was purchased. It was found that discharge through a door was quicker and cleaner than by turning the mixer over.

The concrete falls on a concrete platform in front of which the operators of the machines stand and from which they shovel the concrete to the molds. These men are paid by the block and do all the work except taking the block from the machine. A good block maker will turn out 600 and more blocks a day and at that rate he makes very good wages.

The blocks are placed on cars and run to the steam rooms, where they are given 36 hours of steam curing. Each room holds 300 cars. No record of temperature is kept,



Left—Plant and office building of the Ideal Cement Stone Co., Omaha. Right—Partial view of yards showing blocks which are curing and aggregate in storage

but the blocks are steaming and hot to the touch when they are brought out. They are handled through the steam room and into the yards by the regular system of parallel

R. B. Rasmussen, plant superintendent

tracks, but a car with a turn table is used in place of a transfer truck.

The proper control of steam curing has been found to affect the color of the block, and the best results are obtained by starting the curing with a low temperature and gradually increasing it.

There are 10 Ideal power machines at each plant and two hand Ideal machines, which are used for making angles and special shapes. There is also a power machine for making hollow chimney blocks which the company designed and built at the plant.

A concrete worker is kept busy making trim stones and ornamental pieces which are given various sorts of facing. The granite facing produced in the department looks so much like the real thing that one can hardly believe it to be a cement product. There is a considerable call for garden ornaments and the like in Omaha, as is shown by the sale of more than 300 bird-baths this year by the Ideal company.

The concern has splendid offices and sample rooms in which the various products are displayed. It also maintains a fleet of trucks for delivery and a garage and machine shop. About 60,000 blocks are kept in storage.

Blocks which are broken in handling are sent to a small crushing plant which is situated near the yard. It consists of a small jaw crusher with an elevator and screen, all driven by an old truck engine.

The office of the company is at 31st and Spaulding streets, Omaha. N. J. Peterson is president of the company, Carl Peterson is vice-president and A. V. Johnson is secretary-treasurer. R. B. Rasmussen is superintendent in charge of the plant operation.

Cement Block Business Good in Topeka

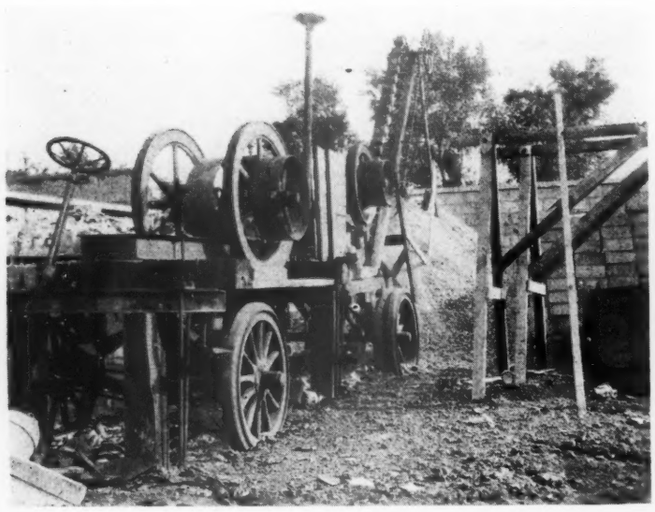
DURING the extensive building program in Topeka, Kas., the cement block business has played a prominent part. It is conservatively estimated that 355,000 cement blocks are supplied by Topeka concerns annually. In addition these companies keep approximately 75,000 blocks on hand.

A survey of the cement block business in Topeka shows the Whalen Lumber Co. handles approximately 150,000 blocks annually, with a stock of 35,000 on hand; the Wessen Coal Co., new in the field, handles about 20,000, with a stock of 5000 on hand; the Portland Cement Stone Co. handles approximately 35,000 with a stock of 8000 to 10,000 on hand.

Robert Kneisler handles approximately 80,000 a year, with a stock of 10,000 to 12,000 on hand. Sargent Cut Stone Co. started July 13, and will handle approximately 70,000 this year, with a stock of 8000 to 10,0000.

George W. Hargreaves will handle about 7000 cinder blocks. The blocks are of the same type as used in the *Topeka Daily Capital* fire-safe home recently demonstrated.

With the exception of the cinder blocks, the entire output is manufactured and practically all used in Topeka.—*Topeka (Kas.) Capital.*



Left—A crusher is used to break up defective blocks which may be used to make new blocks in this way. Right—Garage for the company's own fleet of trucks

Graded Aggregates Make Stronger Concrete

WATER is an important ingredient in concrete. Experiments just completed at the Bureau of Standards, Department of Commerce, show that this is just as true with the new quick-hardening high-alumina cements as with portland cement.

The bureau finds it important to select sand and gravel in proper size gradation since less water is required to make the concrete workable and a greater strength results. The old rule, to use the least amount of water which will make the concrete workable is found to hold with the new high-alumina cement. In one experiment a decrease of 1% of water was found to increase the strength as much as 26%.

The research is part of the program of the materials laboratories of the bureau upon the useful properties of materials and how they may be enhanced.

A gravel concrete made with the new quick-hardening high-alumina cement generally develops as high a strength in 24 hours as a similarly proportioned portland cement concrete would develop in 28 days. This quick-hardening feature is notably valuable where ground rentals are high, equipment elaborate, or construction difficult, or wherever delays in waiting for the concrete to attain its strength would be costly.

National Building Exposition to be Held at Oklahoma City

PLANS have been completed for the holding of a National Building Exposition at the Coliseum in Oklahoma City, Okla., during the Eighteenth Annual Convention of the National Association of

Builders Exchanges, to be held the week of February 22.

One hundred fifty booths will be erected in the Coliseum, and it is hoped to have the most representative showing of building materials that was ever seen in any exposition in the Southwest.

Preparations are being made for the entertainment of 3000 delegates from the various Builders Exchanges of the country, and the Building Exhibition will be one of the features of the program that is being worked out.

G. A. Nichols is the general chairman; and J. B. Landers, secretary-manager of the Builders Exchange, will have charge of the Exposition.

Properties and Manufacture of Concrete Building Units

THE United States Bureau of Standards has just issued a circular describing the properties and manufacture of concrete building units, including concrete brick, block and tile. The circular discusses the proper sizes of aggregates to be used, the use of admixtures facing materials and coloring processes. The various building units are discussed from an architectural and structural standpoint, including fire resistance. Financing the plant is discussed with the advice to local investors to study fully all local conditions which might affect the life of the plant.

A list of books and circulars dealing with the subject is given and also several specifications, including those of the American Society for Testing Materials and the American Concrete Institute.

Rome Cast Stone Company Making Good Progress

IN conjunction with their retail building supply business, the Rome Cast Stone Co., Inc., of Rome, N. Y., operates a plant for the production of sand and gravel and cement blocks. The daily output of this plant, which is located at Lake Delta at present, is about 250 cu. yd. of washed sand and gravel and 500 cement blocks. This is expected to be increased within a short time. E. J. Karlin is president; Howard M. Marriott, treasurer; G. M. Williams, secretary, and D. L. Evans, manager of the plant. Offices are located at 501 South George street, Rome, N. Y.—*Rome (N. Y.) Sentinel.*

Cement Products Company Host to Denver Manufacturers

MEMBERS of the manufacturers' bureau of the Denver, Colo., Chamber of Commerce and of the Colorado-Made Goods Club were guests at luncheon of J. E. Zahn, president of the Western Concrete Products Co. of Denver, Colo.

After the luncheon, the manufacturers made an inspection of the plant and observed the details of the manufacture of the various cement products.

The Western Concrete Products Co. was established at Denver in 1923 and has shown a remarkable growth; its output in 1925 having increased to over three times that of 1923. Since the establishment of the Denver plant there has been formed a corporation with plants at Denver, Kansas City, St. Louis, Omaha, St. Joseph and Des Moines, and with plans for others in the St. Paul and Davenport areas, Oklahoma City and Memphis.—*Denver (Colo.) Rocky Mountain News.*

Construction Industries' Debt to Cement

THE DEBT which modern constructional work owes to portland cement was stressed by H. R. Cox, M.I.S.E., in a lecture delivered at the Royal Technical College, Glasgow, recently, to the Civil Engineering Society. Without portland cement, he said, many modern engineering feats would have been impossible; and in the same way much present-day anxiety regarding certain structures of the past—St. Paul's Cathedral, for instance—would not have arisen if the material had been available to the old builders.

Referring to the improvement in the quality of cement during the past 20 years, and to the recent revision of the British standard specification, Mr. Cox spoke of the work of the Engineering Standard Association. When the standard specification was first published in 1904, minimum tensile strains of 400 lb. per sq. in. (neat cement) and 120 lb. (3 std. sand 1 cement) were called for and a residue up to 22½% on the 32,400-mesh sieve was permitted. Today these figures were 600 lb., 325 lb. and 10%, respectively.

These were minimum requirements and manufacturers were constantly endeavoring to improve on them. In fact today they were making rapid hardening portland cements which would give such strains within 24 hours or so. As a result, methods of construction only recently developed were becoming obsolete, and the engineer who failed to take advantage of the great possibilities of cement must put his clients and the public to much unnecessary loss and inconvenience. The use of concrete today was not confined to buildings, docks, dams, roads, wharves and such work-a-day purposes, but offered a fine medium for recreational facilities in the form of open-air bathing pools, tennis courts, etc. The lecturer cautioned his audience with regard to the testing of cement by amateurs. These, he suggested, sometimes frightened themselves and other people. Cement testing was a matter for skill and experience, and if tests made by an amateur raised any doubt of quality a check test by an expert should always be made.—*Contract Journal, London, England.*

National Concrete Products Association Convention

THE annual convention of the National Concrete Products Association will be held at Cleveland, Ohio, at the Hotel Cleveland on January 27, 28, 29, 1926.

A program of interest is being completed. The special features to be brought out at this convention are the advertising and merchandising methods of successful manufacturers. All concrete product manufacturers are welcome whether association members or not.

"Stone Tile" Plant for Texas

CONSTRUCTION of a plant for the manufacture of concrete pipe, culverts, and building units, which will employ a force of 100 workmen, will soon begin on a site 250x800 ft. on Rock Island trackage at Riverside, Texas, was announced by the local Chamber of Commerce.

The plant will be established by the Best Concrete Pipe Co. of Los Angeles, Calif. A Texas corporation is to be formed with Texas headquarters at Fort Worth. Harry B. Telleyer, district manager for five years of the San Diego and Arizona districts of the company, is expected to take charge of the construction and to remain in Fort Worth permanently.

The company has been operating several years in California and Arizona. It is planned to manufacture all sizes of sewer, drain and irrigation pipe, culverts and the special cement building tile units known as "stone tile."—*Fort Worth (Texas) Star.*

West Coast Consumers Prefer Darker Cements

ONE of the peculiarities noted by Mr. Edmund Shaw, editor of Rock Products, on his recent Western trip was the preference expressed by cement purchasers for the darker colored cements.

All the Washington cement plants add a little iron ore to the mix. As iron and alumina have about the same properties in making cement, this would seem unnecessary, provided enough alumina was present, but it is found that the addition of iron helps the burning of the clinker. It also gives a darker color and this is an important sales factor. Buyers who are used to cement of a certain color think that the cement must be "off" or spoiled if it is of a lighter shade.

Large Cement Cargo for Florida

THE steamer *Lake Florian* is to carry 2000 tons of cement, made by the Texas Portland Cement Co. of Dallas, Texas, to Tampa, Fla., within a short time. This will make the third large cargo of cement shipped by the Texas company to Florida within the past year. The cement will be loaded at the company's own docks at Houston, Texas.—*Houston (Texas) Chronicle.*

Current Market Prices of Cement Products

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

City of shipping point	Sizes 8x8x16	8x10x16	8x12x16
Camden and Trenton, N. J	.....	.19‡	.30‡
Columbus, Ohio	.16@.18a	.....	.....
Detroit, Mich.	16.00*	.....	25.00*
Forest Park, Ill.	18.00*	23.00*	30.00*
Graettinger, Iowa	.18@.20	.....	.....
Indianapolis, Ind.	.13@.15†	.....	.....
Los Angeles, Calif.	4x3½x12—.03;	6x3½x12—.04½;	8x3½x12—.05½
Oak Park, Ill.	.18@.21a	.....	.....
Somerset, Pa.	.20@.22	.....	.....
Yakima, Wash.	22.50*	.....	.....

*Price per 100 at plant. †Rock or panel face. (a) Face. ‡ Delivered.

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	20.00	25.00@35.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00@50.00
Camden and Trenton, N. J.	17.00	
Ensley, Ala. ("Slagtex")	14.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Longview, Wash.	18.00	25.00@50.00
Milwaukee, Wis.	15.00	25.00@45.00
Mt. Pleasant, N. Y.		14.00@23.00
Omaha, Neb.	18.00	30.00@40.00
Pasadena, Calif.	12.50	
Philadelphia, Penn.	†15.25	‡21.50
Portland, Ore.	15.00@17.00	25.00@150.00
Prairie du Chien, Wis.	15.00	22.50
Rapid City, S. D.	18.00	25.00@50.00
Waco, Texas	16.50	32.50@125.00
Watertown, N. Y.	21.00	35.00
Wauwatosa, Wis.	14.00	20.00@42.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	22.50	.....

†Gray. ‡Red.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted.

Culvert and Sewer	4 in.	6 in.	8 in.	10 in.	12 in.	15 in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Detroit, Mich.*	.13½	.20¼	.31½	.47¼	.60¾	1.08	1.62¼	1.95	2.60	2.92½	3.00	3.30	3.75	5.40	6.50	.....	.....
Graettinger, Iowa (drain tile)	.....	.056	.075	.13	.175	.30	.50	.60	.80	1.00	.....	1.60	.....	.....	.....	.....	.....
Grand Rapids, Mich. (b)	.....	.....	.....	.60	.72	1.00	1.28	.....	.....	1.92	2.32	3.00	4.00	.....	.....	.....	.....
Houston, Texas	.....	.19	.24	.43	.55½	.90	.130	.....	†1.70	2.20	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind. (a)	.....	.....	.....	.80	.90	1.10	1.30	.....	.....	1.70	.....	2.70	.....	.....	.....	.....	.....
Longview, Wash.	Sewer pipe 40% off list, culvert—list																
Mankato, Minn. (b)	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.75	2.50	3.25	4.25	.....	.....	.....
Mt. Pleasant, N. Y.	.....	.17	.26	.39	.50	.68	.93	1.29	.....	1.67	.....	.....	.....	.....	.....	.....	.....
Norfolk, Nebr. (b)	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Paullina, Iowa‡	.....	.....	.....	.....	.....	.....	.....	2.25	.....	2.75	.....	3.25	5.00	.....	.....	.....	.....
Tacoma, Wash.	4 in. to 18 in.				15 to 90 cents per foot												
Wahoo, Nebr. (b)	.....	.....	.....	.....	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	4.62	6.14	6.96	7.78
Waukesha, Wis.	4-in. to 24-in.—8.00 per ton																
Yakima, Wash.	$10.00 per ton																

*30-in. lengths up to 27-in. diam., 48-in. lengths after; (a) 24-in. lengths; (b) Reinforced; (c) Interlocking bar reinforced.
† 21-in. diam. ‡ Price per 2 ft. length.

Cement Tile

Prices are net per sq. in carload lots, f.o.b. nearest shipping point unless otherwise stated.

Cicero, Ill.	Hawthorne tile, per sq.
Red Spanish	10.00
Green Spanish	12.00
Red French	9.50
Green French	11.50

	—Cicero— Red	Green
Ridges	.25	.35
Hips	.20	.30
Ridge closers	.05	.06
Hip terminals, 3 way	1.25	1.50
Hip starters	.50	.60
Gable finials	1.25	1.50
Gable starters	.20	.30
End bands	.20	.30
Eave closers	.06	.08

Camden and Trenton, N. J.—8x12, per sq.	
Red	15.00
Green	18.00
Cement City, Mich. — 5"x8"x12", per M	55.00
Detroit, Mich.—5x8x12, per C	8.00
Grand Rapids, Mich.:	Per 1000
5x4x12	45.00
5x8x12	70.00
5x8x 6	35.00
Graettinger, Iowa.—Cement tile per 100 ft.	
5-in.	4.50
6-in.	5.50
8-in.	8.50
10-in.	12.50
12-in.	17.50
14-in.	22.50
16-in.	30.00
18-in.	35.00
20-in.	40.00
22-in.	45.00
24-in.	50.00
Houston, Texas.—Roofing Tile, per sq.	
Red	17.00
Green	19.50
	Per 1000
5x4x12 (Lightweight)	45.00
5x8x12 (Lightweight)	80.00
Indianapolis, Ind.—9"x15"	
Gray	10.00
Red	11.00
Green	13.00
Longview, Wash.—(Stone Tile)	Per 1000
4x6x12	60.00
4x8x12	65.00
Mt. Pleasant, N. Y.:	Per 1000
5x8x12	78.00
Pasadena, Calif.:	Per 1000
4x4x12	$30.00
4x6x12	50.00
4x8x12	60.00
Waco, Texas:	Per sq.
4x4	.60
Wildasin Spur, Los Angeles, Calif:	
4x3½x12	.03½
6x3½12	.04½
8x3½x12	.05½
Yakima, Wash.:	
5x8x12	.10

Blended Cements

TO SECURE economical construction of mass concrete structures built in localities where the transportation of materials is expensive, cements in combination with other materials, such as sand, are often used as the cementing constituent of the concrete. Combinations of this nature are usually prepared by grinding the two materials together for a given period of time or to a definite degree of fineness. The resulting mixtures are quite generally known as blended cements.

During the past 10 or 12 years the U. S. Bureau of Standards has been carrying on studies of blended cements from the standpoint of the durability and strength of mortars and concrete made from them. There is now being prepared a report of the work on various lots of blended cements, giving the strength results at different ages up to and including some 11 and 12-year curing periods.

The major portion of the work is based on strength tests made on a number of concrete, mortar and neat cement specimens prepared from three blended cements used by the United States Bureau of Reclamation for some of its Western projects. The concrete specimens were 8x16-in. cylinders which had been stored out of doors exposed to the weather. Tensile specimens consisted of both neat cement and standard sand mortars cured under both water and inside air storage. Two-inch cubes made of standard sand mortar and kept in air storage were used for the compressive tests of the mortars. All the specimens were prepared at the bureau, and parallel concrete specimens made from a portland cement.

Before testing the concretes at the several ages, the effects of exposure to weather conditions were determind by noting the appearance of the surface of the test cylinders. Concrete from one of the blended cements had withstood satisfactorily the effects of weathering, while some of the specimens of the other two blends showed considerable lack of durability.

The results of the strength tests show no constant relation between the tensile strength of the neat cements or mortars and the compressive strength of the concretes. After considering the range in strengths of the concretes prepared from the blended cements and after studying the strength of mortars of the corresponding ages it is apparent that if definite information is to be secured as to the relative merits and behavior of these materials, as well as the effect of varying the proportions, laboratory tests must be made of the materials in the several proportions which would be used in actual construction.—*Technical News Bulletin*, U. S. Bureau of Standards.

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning November 25:

Central Freight Association Docket

11964. Sand (other than blast, engine, foundry, etc.) and gravel. Lafayette, Ind., to Gardner, Ill. Present, $1.04 per net ton on sand and $1.01 per net ton on gravel; proposed, 88 cents per net ton.

11965. Crushed stone. McVittys, Ohio, to Pomeroy, Ohio. Present, 20 cents; proposed, $1.40 per net ton.

11966. Crushed stone. McVittys, Ohio, to Uniopolis, Geyers, Lagona, Lima, Blessings, Thrifton, Sedalia, Fruitdale and Waverly, Ohio. Present, sixth class rate. Proposed, 90 cents to Uniopolis, Geyers and Lagonda; $1 to Lima, Blessings, Thrifton and Sedalia, and $1.10 per net ton to Fruitdale and Waverly, Ohio.

11968. Crushed stone. McVittys and Marion, Ohio, to Miami City, Dodson, Verona, Arcanum, Delisle, Greenville and Hill Grove, Ohio. Present, sixth class; proposed, $1 per net ton to Miami City, Dodson, Verona and Arcanum, Ohio, and $1.10 per net ton to Delisle, Greenville and Hill Grove, Ohio.

11969. Sand, blast, engine, foundry, glass, loam, molding or silica. Geauga Lake, Ohio, to Sharon, Sharpsville, West Middlesex and Wheatland, Penn. Present rates, $1.26 to Sharpsville, Penn., and $1.13 to other destinations; proposed, $1.01 per ton of 2000 lb.

11975. Crushed stone. Piqua, Ohio, to Springfield, Ohio (Penna R. R. delivery). Present, 90 cents per net ton; proposed, 70 cents per net ton.

11977. Gravel and sand (except blast, core engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica). Medora, Ind., to Crothersville, Austin, Scottsburg, Vernon, Grayford and Dupont, Ind. Present, 12 cents to Crothersville and Austin, Ind.; 13 cents to Vernon, Grayford and Dupont, Ind., and 13½ cents to Scottsburg, Ind. Proposed, 75 cents to Crothersville, Ind.; 80 cents to Austin, Scottsburg, Vernon and Grayford, Ind., and 85 cents per net ton to Dupont, Ind.

Southern Freight Association Docket

23874. Bituminous rock. It is proposed to revise rates on bituminous rock, crushed or ground, carloads, minimum weight 80,000 lb., from Bowling Green, Epleys, Rockport, Summit and Big Clifty, Ky., to Conway, S. C. Present, from Bowling Green and Epleys, Ky., $5.60 per net ton; from Rockport, Summit and Big Clifty, Ky., combination rates are applicable. Proposed, from all points $5.40 per net ton.

23889. Sand and gravel, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern, from Saffold, Ga., to Florida points named below. Present and proposed rates are (in cents per net ton):

To	Present	Proposed
Jacksonville, Fla.	190	158
Tallahassee, Fla.	175.2	140
Madison, Fla.	197.4	158
Monticello, Fla.	130	108

The proposed rates to Jacksonville and Monticello are based on the proposed Alabama-Georgia single line scale, reduced 10%, while the suggested rates to Tallahassee and Madison are based on the proposed Alabama-Georgia joint line scale, less 10%.

23896. Bituminous rock, crushed or ground, carloads, from Bowling Green, Epleys, Big Clifty, Rockport and Summit, Ky., to Hillsboro, Ill. Present rate, East St. Louis, Ill., combination; proposed, $2.77 per net ton, same as in effect to Pana, Ill.

23936. Sand and gravel, carloads, minimum weight marked capacity of car, from Picayune, Miss., to New Orleans, La. (For N. O. & N. E. R. R. delivery only.) Present rate, 83 cents per net ton; proposed, 70 cents per net ton, made in line with rate from competing points on the I. C. R. R. and N. O. G. N. R. R.

23965. Crushed stone, treated with asphaltum, etc. It is proposed to establish mileage commodity rates on crushed stone treated with asphaltum or oil, on basis the same as applicable on bituminous asphalt rock, from Cherokee, Ala., to points on the Southern Ry. and connecting lines. The proposed rates to apply on the following: Crushed stone, coated with oil or asphaltum, carloads, minimum weight 80,000 lb., except when for carriers' convenience a car of less capacity is furnished, in which event marked capaciy of car, but not less than actual weight will govern (in such instances bills of lading and waybills should carry certificates over agent's signature, "Car of greater capacity not available"), but in no case less than 50,000 lb. The minimum weight will be charged for on each car when the actual amount loaded is less.

Illinois Freight Association Docket

2305-A. Bituminous rock, crushed or not crushed, carloads, minimum weight 80,000 lb., except when car of less capacity is used for carriers' convenience, the actual weight will apply, but not less than 60,000 lb., from Evansville, Ind. (when originating in Kentucky). To groups in W. T. L. Tariff 50L: 1 (Manchester) to 5 (Ottuma), both inclusive. Proposed, 17.6, 6 (Waterloo) to 10 (Waverly), both inclusive; proposed, 17.6, 11 (Mason City) to 15 (Ft. Dodge), both inclusive; proposed, 19.6, 16 (Cambridge) and 17 (Des Moines); proposed, 17.6.

Western Trunk Line Docket

3663-B. Stone, crushed, carloads, from Sioux Falls, East Sioux Falls and Rowena, S. D., to Hills, Minn., and Rock Rapids, Iowa (rates in cents per ton of 2000 lb.):

To	Present	Proposed
Hills, Minn.	85	63
Rock Rapids, Iowa	110	63

Minimum weight, marked capacity of car.

New England Freight Association Docket

9198. Sand (blast, engine, glass, molding, foundry or silica). Minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply, from Brookview and Van Hoesen, N. Y., to Bloomfield, N. J., 14½ cents. Reason—to place the rate from Brookview and Van Hoesen on a parity with the rate published from the Albany district.

9225. Crushed stone. Minimum weight 90% of marked capacity of car (except when car is loaded to cubical or visible capacity, actual weight will apply) from West Chelmsford, Mass., to New Haven, Conn., $1.89 per net ton via B. & M.-Worcester, Mass., N. Y., N. H. & H. R. R. Reason—To provide a rate via Worcester, Mass., which is the natural route, equal to the combination of local rates via Lowell, Mass.

Ask Lower Interstate Gravel Rate

COMPLAINTS against the rates on sand and gravel from Dubuque, Iowa, to points in Illinois, were heard by Examiner Keller of the Interstate Commerce Commission at Galesburg, Ill., recently. The complaints alleged that the rates were unreasonable. The cases were taken under advisement.—*Davenport (Iowa) Democrat.*

Mining Catalog for 1925

THE Consolidated Publishing Co. of Pittsburgh, Penn., have issued the metal-quarry edition of their 1925 mining catalog. The book of 928 pages is divided into 26 sections covering the metal, non-metallic mining, sand, gravel, cement and quarrying industries thoroughly. Each of these sections covers a particular field of operation and in connection with description of the equipment and machinery used, contains much informational data of great value to operators and engineers. Of particular interest to rock products industries are those sections devoted to drilling and blasting, excavating, dredging, crushing, grinding, etc., and lime and cement burning. The book section is carefully indexed according to industries and authors.

The entire book is completely indexed according to equipment displays, manufacturers, engineering data and type of product such as crushed rock, lime, cement, etc. The catalog, in its new form is sure to be of interest and value to all rock products industries.

The Aggregate Industry in Australia

THE use of concrete is increasing in Australia and naturally the aggregate industry is growing proportionately. Near Sydney, one of the two large cities, there are three principal producers of aggregate. These are the New South Wales Blue Metals Quarry Co., the Emu Prospect Gravel and Rail Metal Co., and the Napian Sand and Gravel Co.

The quarry company operates three quarries and produces about 350,000 tons per year. The rock is a columnar basalt which would probably be called trap rock in this country. Owing to its columnar formation it breaks easily although it is extremely hard and drills slowly.

The sand and gravel companies together produce about 500,000 tons per year. In addition to private company production a large amount of aggregate comes from a quarry owned by the New South Wales government which produces 500,000 tons per annum. A lot of this is used in government work.

A. J. Swan of Sydney, president of the (Australian) Standard Cement Co., who supplied the above information, is connected with the Blue Metals Quarry Co. and interested in other enterprises of the same kind.

Aggregate in Australia

HERBERT MARGERUM, Trenton, N. J., is reported to have acquired the plants of the Erwin Feldspar Co., Erwin, Tenn., including 10,000 acres of mine properties and deposits in North Carolina and Tennessee, chief plants at Erwin, Tenn., and other at Spruce Pine, N. C.

It is expected that he will develop the property and produce feldspar for use in the pottery industry. The plants will also be enlarged. Robert W. Lawson has been named as general manager. Operations are expected to continue under the same name but as a subsidiary of the Golding Sons Co.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50	.....	1.75	1.25	1.25	1.25
Cobleskill, N. Y.	1.50	1.35	1.25	1.25	.....	.....
Eastern Pennsylvania	1.35	1.35	1.35	1.35	1.35	1.35
Frederick, Md.	.50	.75	1.30	1.20	1.10	1.10
Munns, N. Y.	1.00	1.50	1.50	1.40	1.40	.....
Northern New Jersey	1.60	1.50@1.80	1.30@2.00	1.40@1.60	1.40@1.60	.....
Walford, Penn.	1.00	1.30	.....	1.50h	1.50h	.....
Watertown, N. Y.	.50	.....	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Afton, Mich.	.....	.....	.....	.....	.50	.....
Alton, Ill.	1.75	.....	1.75	.....	.....	.....
Bloomville, Middlepoint, Dunkirk Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio; Monroe, Mich.; Huntington, Bluffton, Ind.	1.00	1.10	1.10	1.00	1.00	1.00
Buffalo and Linwood, Iowa	1.10	.....	1.20	1.00	1.05	1.05
Carey, Ohio	.65@ .75	.90@1.10	.85@1.00	.80@ .90	.80@ .90	.80@ .90
Chazy, N. Y.	.75	1.65	1.65	1.40	1.40	1.40
Chasco, Ill.	.....	1.15	1.15	1.15	1.15	.....
Columbia, Krause, Valmeyer, Ill.	1.00@1.50	1.20@1.25	1.20@1.25	1.20	1.20	1.50
			Flux all at 1.30			
Cypress, Ill.	1.15	1.15	1.15	1.15	1.05	1.00
Gary, Ill.	1.00	1.37½	1.37½	1.37½	1.37½	1.37½
Greencastle, Ind.	1.25	1.15	1.15	1.05	.95	.95
Lannon, Wis.	.80	1.00	1.00	.90	.90	.90
Milltown, Ind.	.....	.85@1.00	.75@ .90	.85@1.00	.85@ .90	.85@ .90
Northern New Jersey	1.30	.....	1.80	1.60	1.40	.....
River Rouge, Mich.	1.10	1.10	1.10	1.10	1.10	1.10
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	1.10
St. Vincent de Paul, Que.	.85	1.35	1.05	.95	.90	.90
Stone City, Iowa	.75	.....	1.10	1.05	1.00	.....
Waukesha, Wis.	.90	.90	.90	.90	.90	.90
SOUTHERN:						
Alderson, W. Va.	.50	1.60	1.60	1.50	1.40	.....
Allgood, Ala.			Crusher run, fines out, for flux, 1.00 per net ton			
Cartersville, Ga.	1.65	1.65	1.65	1.15	1.15	1.15
Chico, Texas	1.00	1.35	1.35	1.25	1.20	1.10
El Paso, Texas	1.00	1.10	1.10	1.10	.....	.....
Ft. Springs, W. Va.	.50	1.60	1.50	1.35	1.25	.....
Graystone, Ala.			Crusher run fluxing stone, 1.00 per net ton			
Henderson, N. C.	.....	.....	1.50	.....	1.25	.....
New Braunfels, Texas	.50@ .60	1.00@1.20	1.00@1.20	.80@1.00	.75@ .90	.75@ .90
Olive Hill, Ky.	.50@1.00‡	1.00	1.00	1.00	1.00	1.00
Rockwood, Ala.	.90	.....	.....	.....	1.00	.90
Rocky Point, Va.	.50@1.00	1.40@1.60	1.30@1.40	1.15@1.35	1.10@1.20	1.00@1.05
WESTERN:						
Atkinson, Kans.	.25	2.00	2.00	2.00	2.00	1.60‖@1.80
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.25	.....	1.25	1.25	1.00	.....
Kirkfield, Ontario	.70	1.05	.90	.90	.90	.90
Rock Hill, St. Louis Co., Mo.	1.25	1.25	1.25	1.25	1.25	1.35

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.70	1.45	1.20	1.05	.....
Duluth, Minn.	.90	2.25	1.90	1.50	1.35	1.35
Dwight, Calif.	1.00	1.00	1.00	.90	.90	.....
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Texas	2.50	1.60@2.00	1.55	1.40@1.50	1.25@1.30	.....
New Haven, New Britain, Meriden & Wallingford, Conn.	.60	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.80	2.00	1.80	1.40	1.40	.....
Oakland and El Cerritto, Cal.	1.00	1.00	1.00	.90	.90	.....
Sheboygan, Wis.	1.00	1.10	1.10	1.10	1.10	.....
Springfield, N. J.	1.70e	2.00	2.10	1.70	1.70	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	.....	1.40	.....
Coldwater, N. Y.—Dolomite			1.50 all sizes			
Columbia, S. C.—Granite	.50	1.75	1.75	.....	1.60	.....
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Havelock, Ontario	.....	2.60	2.10	2.10	.....	.....
Lithonia, Ga. (granite)	.75a@1.75	1.60	.....	1.35	1.35	.....
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	.....
Middlebrook, Mo.—Granite	3.00@3.50	.....	2.00@2.25	2.00@2.25	.....	1.25@2.00
Northern New Jersey (Basalt)	1.50	2.00	1.80	1.40	1.40	.....
Richmond, Calif.—Quartzite	.75*	.....	1.50*	1.50*	1.50*	.....
Toccoa, Ga. (granite)	.50	.....	1.35@1.50	1.25@1.50	1.25@1.35	.....

*Cubic yd. †1 in. and less. ‡Two grades. ‖Rip rap per ton. (a) Sand. (b) to ¼ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Dust. (f) ¾ in. (h) less 10c discount. (i) 1 in., 1.40.

Agricultural Limestone

(Pulverized)

Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 90% thru 100 mesh		4.00
Asheville, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk		2.75
Belfast and Rockland, Me. (rail), Lincolnville, Me. (water), analysis $CaCO_3$ 90.04%; $MgCO_3$ 1.5%, 100% thru 14 mesh, bags		4.50
Bulk		3.00
Branchton and Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)		5.00
Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$; pulverized; 50% thru 50 mesh		1.50
Cartersville, Ga.—Analysis 68% $CaCO_3$, 32% $MgCO_3$; pulverized		2.50
50% thru 50 mesh		2.00
Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk		2.50
Colton, Calif.—Analysis 90% $CaCO_3$, bulk		4.00
Cypress, Ill.—90% thru 100 mesh		1.35
Danbury, Conn., Rockdale and West Stockbridge, Mass.—Analysis, 90% $CaCO_3$, 5% $MgCO_3$; 50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk		3.25
Henderson, N. C. (paving dust)—80% thru 200 mesh, bags	4.25@	4.75
Bulk	3.00@	3.50
Analysis $CaCO_3$, 56%; $MgCO_3$, 42%; 65% thru 200 mesh, bags		3.95
Bulk		2.70
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$; 75% thru 100 mesh; sacked		5.00
Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk		2.50
Knoxville, Tenn.—Analysis, 52% $CaCO_3$, 37% $MgCO_3$; 80% thru 100 mesh; bags, 3.95; bulk		2.70
80% thru 200 mesh, bulk		3.50
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.10; bulk		3.60
Marion, Va.—Analysis, 90% $CaCO_3$, pulverized, per ton		2.00
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 90% thru 100 mesh	3.90@	4.50
Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk	1.35@	1.60
Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100	2.50@	2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk		3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk		5.50
Rocky Point, Va.—Analysis 99.5% $CaCO_3$, 0.25% $MgCO_3$; 50% thru 200 mesh; bags, 3.25@3.50; bulk	2.00@	2.25
Waukesha, Wis.—90% thru 100 mesh		4.50
Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk		2.50

Agricultural Limestone

(Crushed)

Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 90% thru 50 mesh, 6.00; 50% thru 4 mesh		4.00
Alderson, W. Va.—Analysis, 90% $CaCO_3$; 50% thru 100 mesh		1.50
Atlas, Ky.—Analysis over 90% $CaCO_3$; 90% thru 4 mesh	1.00@	2.00
Bedford, Ind.—Analysis, 98.5% $CaCO_3$, 0.5% $MgCO_3$; 90% thru 10 mesh		1.50
Bettendorf, Iowa—97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh		1.50
Blackwater, Mo.—Analysis, 99% $CaCO_3$; 90% thru 4 mesh		.60
(Continued from preceding page)		
Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh		1.75
50% thru 4 mesh		1.50
Chasco, Ill.—50% thru 100 mesh		1.20
Chico, Texas—90% thru 4 mesh; bulk		1.50

(Continued on next page)

Agricultural Limestone

Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh ..... .80
Columbia, Krause, Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 90% thru 4 mesh 1.35
Cypress, Ill.—90% thru 50 mesh, 50% thru 100 mesh, 90% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh 1.35
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh 1.50
Garnet, Okla.—All sizes 1.25
Gary, Ill.—Analysis, approx. 60% $CaCO_3$, 40% $MgCO_3$; 90% thru 4 mesh ..... .75
Kansas City, Mo.—50% thru 100 mesh 1.25
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh 2.00
Screenings (¼ in. to dust) 1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk 1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 50% thru 50 mesh .... 1.85@ 2.35
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 25 to 45% thru 100 mesh 1.60
Milltown, Ind. — Analysis $CaCO_3$, 93.10%, 40% thru 50 mesh ..... 1.35@ 1.60
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh 1.50
Pixley, Mo.—Analysis, 96% $CaCO_3$; 50% thru 50 mesh 1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh 1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk ..... .80@ 1.40
Stone City, Iowa. — Analysis, 98% $CaCO_3$; 50% thru 50 mesh ..... .75
Tulsa, Okla.—Analysis $CaCO_3$, 86.15%, 1.25% $MgCO_3$, all sizes 1.25
Waukesha, Wis.—Test, 107.38% bone dry, 100% thru 10 mesh; bags, 2.85; bulk 2.10

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk 3.00
Piqua, Ohio, sacks, 4.50@5.00 bulk .... 3.00@ 3.50
Rocky Point, Va.—80% thru 200 mesh; bags ..... 4.25@ 4.75
Waukesha, Wis.—90% thru 100 mesh, bulk 3.70

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Glass Sand

Berkeley Springs, W. Va.—Glass sand .. 2.25
Cedarville and S. Vineland, N. J.—
Damp 1.75
Dry 2.25
Cheshire, Mass.:
6.00 to 7.00 per ton; bbl 2.50
Columbus, Ohio ..... 1.25@ 1.50
Estill Springs and Sewanee, Tenn. 1.50
Franklin, Penn. 2.25
Gray Summit and Klondike, Mo. 2.00
Los Angeles, Calif.—Washed 5.00
Mapleton Depot, Penn. ..... 2.00@ 2.25
Massillon, Ohio 3.00
Mineral Ridge and Ohlton, Ohio 2.50
Oceanside, Calif. 3.00
Ottawa, Ill.—Chemical and mesh guaranteed 1.25
Pittsburgh, Penn.—Dry 4.00
Damp 3.00
Red Wing, Minn.:
Bank run 1.50
Ridgway, Penn. ..... 2.00@ 2.25
Rockwood, Mich. ..... 2.75@ 3.25
Round Top, Md. 2.25
San Francisco, Calif. ..... 4.00@ 5.00
St. Louis, Mo. 2.00
Sewanee, Tenn. 1.50
Thayers, Penn. 2.50
Utica, Ill. ..... 1.00@ 1.15
Zanesville, Ohio 2.50
Core and Foundry Sand:
Aetna, Ind.:
Core, Box cars, net, .35; open-top cars ..... .30
Albany, N. Y.:
Molding coarse 2.00
Brass molding 1.75
Sand blast 4.50
Molding fine 2.75

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica and Franklinville, N. Y.	.75	.75	.85	.75	.75	.75
Buffalo, N. Y.	1.10	.95			.85	
Erie, Pa.		1.00*		1.50*	1.75*	
Farmingdale, N. J.	.58	.48	.75	1.25	1.10	
Hartford, Conn.	.65*					
Leeds Junction, Me.		.50	1.75		1.35	1.25
Machias Jct., N. Y.		.75	.75		.75	.75
Montoursville, Pa.	1.00@1.25	1.10@1.25	1.00	.90	.90	.75
Northern New Jersey	.50	.50	1.25	1.25	1.25	
Olean, N. Y.		.75	.75	.75	.75	.75
Shining Point, Penn.			1.00	1.00	1.00	1.00
South Heights, Penn.	1.25	1.25	.85	.85	.85	.85
Washington, D. C.	.85	.85	1.70	1.50	1.30	1.30
CENTRAL:						
Algonquin and Beloit, Wis.	.50	.40	.60	.60	.60	.60
Attica, Ind.	.75	.75	.75	.75	.75	.75
Barton, Wis.		.50	.75	.75	.75	.75
Boston, Mass.‡	1.60	1.60	2.50	2.50	2.50	2.50
Chicago, Ill.	.70	.50	.50	.60	.60	.60
Columbus, Ohio		.70	.50	.70	.70	
Des Moines, Iowa	.40	.40	1.20	1.50	1.50	1.50
Eau Claire, Wis.	.85@1.25	.40@ .50	.80@1.25	.95@1.05		.85@ .95
Elgin, Ill.		.20*	.50*	1.50*	1.50*	1.50*
Elkhart Lake, Wis.	.60	.40	.50	.50	.50	.50
Ferrysburg, Mich.		.50@ .80	.60@1.00	.60@1.00		.50@1.25
Ft. Dodge, Iowa	.85	.85	2.05	2.05	2.05	2.05
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Haven, Mich.		.40@ .80		.60@1.00		
Grand Rapids, Mich.	.50	.50	.90	.80	.80	.70
Hamilton, Ohio		1.00			1.00	
Hersey, Mich.	.50	.50		.80	.70	.70
Humboldt, Iowa		.85	2.00	2.00	2.00	
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Mason City, Iowa	.45@ .55	.45@ .55	1.35@1.45	1.45@1.55	1.40@1.50	1.35@1.45
Mankato, Minn.		.50	1.35	.60e	1.35	1.35
Mattoon, Ill.	.75	.75	.75	.75	.75	.75
Milwaukee, Wis.		1.01	1.21	1.21	1.21	1.21
Moline, Ill.	.60@ .85	.60@ .85	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Northern New Jersey	.50	.50	1.25	1.25	1.25	
Oregon City, Ore.		1.25	1.25	1.25	1.25	1.25
Palestine, Ill.	.75	.75	.75	.75	.75	.75
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
St. Louis, Mo.	1.18	1.45	1.65	1.45	1.65	1.45c
Terre Haute, Ind.	.75	.60	.75	.85	.75	.75
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.		.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	1.50	1.25	1.10	1.00
Yorkville, Sheridan, Oregon, Moronts, Ill.		.40@ .70	.30@ .50	.50@ .60	.60	.60
Zanesville, Ohio	.70	.60	.60	.60	.80	
SOUTHERN:						
Charleston, W. Va.		All sand, 1.40.		All gravel, 1.50.		
Chattanooga, Tenn.		1.45			1.20	1.20
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.00
Lindsay, Texas					.55	
Macon, Ga.	.50	.50	3.50*	3.50*	3.50*	3.50*
New Martinsville, W. Va.	1.00	.80@ .90	1.20@1.30			.80@ .90
Roseland, La.	.50	.50	1.50	1.00	1.00	1.00
WESTERN:						
Baldwin Park, Calif.	.20	.20	.40	.50	.50	
Kansas City, Mo.	.80	.70				
Los Angeles, Calif. (d)	.50	.40	.40	.75	.75	.75
Los Angeles district (bunkers)†	1.50	1.40	1.85	1.85	1.85	1.85
Phoenix, Ariz.	1.25*	1.00*	2.50*	2.00*@2.25*	1.75*	1.50*
Pueblo, Colo.	1.10*	.90*		1.60*		1.50*
San Diego, Calif.		.60	1.25	1.20	1.00	1.00
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*	1.50*	1.50*	1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			Dust to 3 in., .40			
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Chicago, Ill.	.95					
Des Moines, Iowa	.50					
Dudley, Ky. (crushed silica)	1.10	1.10		.90		
East Hartford, Conn.			Sand, .65			
Elkhart Lake, Wis.	.50					
Ferrysburg, Mich.						.65@1.00
Gainesville, Texas		.95				.55
Grand Rapids, Mich.	.50	.50		.60		
Hamilton, Ohio					.70	
Hersey, Mich.				.50		
Indianapolis, Ind.			Mixed gravel for concrete work, at .65			
Lindsay, Texas	1.30					.55
Macon, Ga.		.35				
Mankato, Minn.			Pit run sand, .50			
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Ottawa, Oregon, Moronto and Yorkville, Ill.			Ave. .60 per ton all sizes			
St. Louis, Mo.			Mine run gravel, 1.55 per ton			
Shining Point, Penn.			Concrete sand, 1.10 ton			
Smithville, Texas	.50	.50	.50	.50	.50	.50
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Winona, Minn.	.60	.60	.60	.60	.60	.60
York, Penn.	1.10	1.00				

(a) ¾ in. down. (b) River run. (c) 2½ in. and less.
*Cubic yd. †Include freight and bunkerage charges and truck haul. ‡Delivered on job.
(d) Less 10c per ton if paid E.O.M. 10 days. (e) pit run.

Miscellaneous Sands

(Continued from preceding page)

Arenzville, Ill.:		
Core		.75
Molding fine	1.50@	1.75
Beach City, Ohio:		
Core		1.75
Stone, sawing, coarse		1.75
Molding, fine and coarse, washed	1.75@	2.25
Traction	1.50@	2.00
Furnace lining	2.00@	2.50
Cheshire, Mass.:		
Glass sand, 24 and 40 mesh, bulk		5.00
Columbus, Ohio:		
Core	.20@	1.50
Traction	.20@	1.25
Stone sawing		1.50
Brass molding	2.00@	2.50
Molding fine	1.50@	2.50
Furnace lining	2.00@	2.50
Molding coarse	1.50@	2.00
Sand blast	3.50@	4.00
Eau Claire, Wis.:		
Sand blast	3.00@	3.25
Core		1.00
Roofing sand		4.25
Elco, Ill.:		
Ground silica per ton in carloads	18.00@	31.00
Elnora, N. Y.:		
Brass molding		1.75
Estill Springs and Sewanee, Tenn.:		
Molding fine and core		1.25
Roofing sand, sand blast, traction	1.35@	1.50
Franklin, Penn.:		
Molding fine and coarse and core		1.75
Gray Summit and Klondike, Mo.:		
Core, roofing and brass molding		2.00
Molding fine and coarse, traction		1.75
Furnace lining		1.00
Stone sawing	.85@	1.00
Joliet, Ill.:		
No. 2 molding sand; also loam for luting purposes and open-hearth work	.65@	.85
Kasota, Minn.:		
Stone sawing		1.00
Mapleton Depot, Penn.:		
Glass sand	2.00@	2.25
Molding fine, coarse and traction		2.00
Massillon, Ohio:		
Core, molding fine and coarse (green), 1.75; dry		2.25
Furnace lining		2.50
Michigan City, Ind.:		
Core and Traction	.15@	.30
Mineral Ridge and Ohlton, Ohio:		
Furnace lining, molding coarse, sand blast, traction (damp)		1.75
Roofing sand (damp)	1.75@	2.00
Core, molding fine (damp)		2.00
Glass sand (dry)		2.50
Montoursville, Penn.:		
Traction	1.10@	1.25
Core	1.25@	1.50
New Lexington, Ohio:		
Molding fine		2.00
Molding coarse		1.50
Oceanside, Calif.:		
Roofing sand		3.50
Ottawa, Ill.:		
Molding coarse (crude silica, not washed or dried)	.75@	1.00
Red Wing, Minn.:		
Core, furnace lining, stone sawing		1.50
Molding fine and coarse, traction		1.25
Sand blast		3.50
Filter sand		3.75

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Emporium nd Dubois, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Pa.	2.50	1.00	.....	1.25	.....	.....	.....
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	.....	1.45	1.80@1.85	1.45	.....	1.45	1.45
Jackson, Ohio	.....	1.05	.....	1.30@1.35	1.05	.....	1.30@1.35
Toledo, Ohio	1.50	1.25	1.25	1.25	1.25	1.25	1.25
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.	.....	1.55	.....	1.55	1.55	1.55	1.55
Ensley and Alabama City, Ala.	2.05	.80	1.35	1.25	.90	.90	.80
Longdale, Roanoke, Ruessens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.	.....	.....	12.00	.....	.....	.....	.....	2.20
Buffalo, N. Y.	.....	10.00	.....	12.00	.....	.....	.....	.....
Chazy, N. Y.	12.50	9.50	9.00	13.50	11.50	16.50	10.50	2.90
Lime Ridge, Penn.	.....	.....	.....	.....	.....	.....	5.00a	.....
West Stockbridge, Mass. (f)	13.00	10@11.00	5.00	.....	.....	.....	.....	2.25t
Williamsport, Penn.	.....	.....	10.00	.....	.....	.....	6.00	.....
York, Penn.	.....	10.50	10.50	11.50	9.00	10.50	8.50	1.65i
CENTRAL:	----							
Afton, Mich.	.....	.....	.....	.....	.....	.....	8.75	1.65u
Carey, Ohio	12.50	8.50@9.50	9.50	.....	9.50	.....	9.00	.....
Cold Springs, Ohio (f)	12.50	10.00	9.00	.....	9.00	11.00	9.00	.....
Delaware, Ohio	12.50	10.00	9.00	10.00	.....	.....	9.00	1.50
Frederick, Md.	.....	10.00	9.50	10.00	.....	.....	7.50	1.45
Gibsonburg, Ohio (f)	12.50	10.00	9.00	.....	9.00	11.00	9.00	.....
Huntington, Ind.	12.50	10.00	9.00	.....	.....	.....	.....	.....
Luckey, Ohio (f)	12.50	.....	.....	.....	.....	.....	.....	.....
Marblehead, Ohio	.....	10.00	9.00	.....	.....	.....	9.00	1.50c
Marion, Ohio	.....	10.00	9.00	.....	.....	.....	9.00	1.50c
Milltown, Ind.	.....	.....	10.00‡	11.00@12.00	.....	.....	8.50‖	1.40w
Sheboygan, Wis.	.....	.....	.....	.....	.....	.....	9.50	.....
Tiffin, Ohio	.....	.....	.....	.....	9.00	.....	.....	.....
White Rock, Ohio	12.50	.....	.....	.....	9.00	11.00	.....	.....
Wisconsin (Brillion, Clifton, Grimms, Green Bay, Hamilton, Hayton, Knowles, Nasbro, Quarry) (f)	.....	11.50	.....	.....	.....	.....	9.50	.....
Woodville, Ohio	12.50	8.00	9.00	.....	9.00	10.00	9.00	1.50
SOUTHERN:								
Allgood and Saginaw, Ala.	12.50	10.00	.....	10.00	.....	1.35u	8.50	1.50
El Paso, Texas	.....	.....	.....	.....	.....	.....	10.00	1.75
Graystone, Landmark and Wilmay, Ala.	12.50	10.00	.....	.....	.....	.....	8.50	1.50
Keystone, Ala.	.....	10.00	10.00	10.00	.....	.....	8.50	15.00
Knoxville, Tenn.	20.50	10.00	10.00	10.00	.....	.....	8.50	1.50
Ocala and Zuber, Fla.	12.00	12.00	10.00	.....	.....	.....	12.00	1.70
WESTERN:								
Kirtland, N. M.	.....	.....	.....	.....	.....	.....	15.00	.....
New Braunfels, Texas	12.00	12.00	10.00	12.00	.....	.....	9.50	1.50
San Francisco, Calif.	21.00	21.00	12.50@15.00	21.00	.....	.....	14.50	1.90v
Tehachapi, Calif.	.....	.....	8.00	.....	.....	.....	13.00z	2.20x

†50-lb. paper bags; (a) run of kilns; (c) wooden, steel 1.70; (d) wood; (e) per 180-lb. barrel; (f) dealers' prices; (g) to 9.50; (h) to 1.75; (i) 180-lb. net barrel 1.65; 280-lb. net barrel, 2.65 (m) finishing lime, 3.00 common; (n) common lime; (o) high calcium; (p) to 11.00; (q) to 8.50; (r) to 1.50; (s) in 80-lb. burlap sacks; (t) common, 2.50 plastering; 3.00 finishing; (u) two 90-lb. bags; (v) oil burnt; wood burnt 2.25@2.50; (x) wood, steel 2.30; (z) to 15.00; (*) quoted f.o.b. New York; (‡) paper bags; (w) to 1.50 in two 90-lb. bags, wood bbl. 1.50@1.60; (‖) to 10.00.

Miscellaneous Sands

(Continued)

Ridgeway, Pa.:		
Molding fine and coarse		1.50
Core		2.00
Round Top, Md.:		
Core		1.60
Glass sand		2.25
Traction		1.75
Sand blast		2.25
Roofing sand		2.25
Molding coarse	1.25@	1.75
Roofing sand		1.25
Sand blast	3.50@	4.50
Stone sawing	1.25@	2.25
Traction		1.25
Brass molding	2.00@	3.00
Sewanee, Tenn.:		
Molding fine and coarse, roofing sand, sand blast, stone sawing, traction, brass molding		1.25
Skerkston, Ont.:		
Traction (lake sand)		.65
Tamalco, Ill.:		
Molding coarse	1.25@	1.50
Tamms, Ill.:		
Ground silica per ton in carloads	20.00@	31.00
Thayers, Penn.:		
Core		2.00
Molding fine and coarse		1.25
Traction		2.25
Utica, Ill.:		
Glass sand and brass molding		.75
Molding fine		.60
Core and molding coarse	.55@	1.25
Furnace lining	.60@	1.25
Traction		1.00
Roofing and stone sawing	1.00@	2.50
Sand blast		2.50
Utica, Penn.:		
Core		2.00
Molding fine and coarse		1.75
Warwick, Ohio:		
Core, molding fine and coarse (green)		1.75
Core, molding fine (dry)		2.25
Zanesville, Ohio:		
Molding fine	1.75@	2.00
Molding coarse	1.50@	1.75
Brass molding		1.50

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:		
Crude talc (mine run)	3.00@	4.00
Ground talc (20-50 mesh), bags		10.00
Cubes		55.00
Blanks (per lb.)		.08
Pencils and steel worker's crayons		.08
per gross		1.25
Chatsworth, Ga.:		
Crude talc		5.00
Ground talc (150-200 mesh) bags	9.00@	12.00
Pencils and steel worker's crayons, per gross		1.50
Chester, Vt.:		
Ground (150-200 mesh), bulk	8.00@	9.00
Including bags	10.00@	11.00
Chicago and Joliet, Ill.:		
Ground (150-200 mesh), bags		30.00
Dalton, Ga.:		
Crude talc		5.00
Ground talc (150-200) bags		10.00
Pencils and steel workers' crayons, per gross	1.00@	2.50
Emeryville, N. Y.:		
(Double air floated) including bags;		
325 mesh		14.75
200 mesh		13.75
Hailesboro, N. Y.:		
Ground white talc (double and triple air floated) including bags, 350 mesh	15.50@	20.00
Henry, Va.:		
Crude (mine run)	3.50@	4.00
Ground talc (150-200 mesh), bags	9.75@	15.00
Joliet, Ill.:		
Ground talc (150-200) bags	12.00@	30.00
Keeler, Calif.:		
Ground (200-300 mesh), bags	20.00@	30.00
Natural Bridge, N. Y.:		
Ground talc (300-325 mesh), bags		13.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 68-72%	4.50@	5.00
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.		5.00
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	7.00@	8.00

Ground Rock

(2000 lbs.)

Centerville, Tenn.—B.P.L. 65%		7.00
Gordonsburg, Tenn.—B.P.L. 65-72%	4.00@	5.00
Mt. Pleasant, Tenn.—B.P.L. 65%; bulk	5.00@	6.00
Twomey, Tenn.—B.P.L. 65%	7.00@	8.00

(Continued on next page)

(Continued from preceding page)

Florida Phosphate
(Raw Land Pebble)
(Per Ton.)

Florida—F. O. B. mines, gross ton, 68/66% B.P.L., Basis 68%	3.00
70% min. B.P.L., Basis 70%	3.55
72% min. B.P.L., Basis 72%	4.10
75/74% B.P.L., Basis 75%	4.85
77/76% B.P.L., Basis 77%	5.60

Fluorspar

Fluorspar, 85% and over calcium fluoride, not over 5% silica, per net ton, f.o.b. Illinois and Kentucky mines	16.00
No. 2 lump, per net ton	19.00
Fluorspar, foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Philadelphia, duty paid, per net ton	16.00
Fluorspar, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, per net ton, f.o.b. Illinois and Kentucky mines	32.50

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Barton, Wis., f.o.b. cars		10.50
Brandon, Vt.—English pink and English cream	*11.00	*11.00
Buckingham, Que.—Buff stucco dash		‡12.00@14.00
Chicago, Ill. — Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		8.00@10.00
Easton, Pa., and Phillipsburg, N. J.—Green grits or facings		1.50@ 3.00
Haddam, Conn. — Felstore buff	15.00	15.00
Harrisonburg, Va.—Blk marble (crushed, in bags)	†12.50	†12.50
Ingomar, Ohio		6.00@18.00
Middlebrook, Mo.—Red		20.00@25.00
Middlebury and Brandon, Vt.—Middlebury white‡	7.00@11.00	7.00@11.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Stockton, Calif. — "Natrock" roofing grits		14.00
Tuckahoe, N. Y.		12.00
Villa Grove, Colo.		13.00
Wauwatosa, Wis.		16.00@45.00
Wellsville, Colo.—Colorado Travertine Stone	15.00	15.00

†C.L. Less than C.L., 15.50.
*C.L. including bags; L.C.L. 14.50.
‡C.L. including bags.

Potash Feldspar
(Pulverized)

Auburn and Brunswick, Me.—Color, white; 98% thru 140 mesh bulk	19.00
Bath, Me.—Color, white; analysis, potash, 12%; 100% thru 180 mesh, bags, 21.00; bulk	18.00
Buckingham, Que.—Color, white; analysis, K_2O, 12-13%; Na_2O, 1.75%; bulk	9.00
De Kalb Jct., N. Y.—Color, white; bulk	8.00
Erwin, Tenn.—Color, white; analysis, 12.07% K_2O, 19.34% Al_2O_3; Na_2O, 2.92%; SiO_2, 64.76%; Fe_2O_3, .36%; 98.50% thru 200 mesh, bags, 16.90; bulk	15.50
Los Angeles, Calif.—Color, white; analysis, K_2O, 10.35%; Na_2O, 3.62%; Al_2O_3, 18.71%; SiO_2, 65.48%; Fe_2O_3, .17%; 100% thru 150 mesh, bags, 24.00; bulk	22.00
Murphsboro, Ill.—Color, prime white; analysis K_2O, 12%; Na_2O, 2%; 65% SiO_2; crude, bags, 13.00; bulk	18.00
100% thru 200 mesh; bags, 22.00; bulk	21.00
100% thru 100 mesh; bags, 20.00; bulk	19.00
Penland, N. C.—Color, white; bulk	16.50
Tenn. Mills—Color, white; analysis K_2O, 18%; Na_2O_3, 10%; 68% SiO_2; 99% thru 200 mesh; bulk	18.00
99% thru 140 mesh, bulk	16.00
Trenton, N. J.—Crude, bulk	12.00@27.00
99% thru 140 mesh; bulk (Bags 11 cents each, non-returnable)	16.00
Wheeling, W. Va.—Color, white; analysis,, K_2O, 9.50%; Al_2O_3, 16.70%; Na_2O, 3.50%; SiO_2, 69.50%; 99% thru 140 mesh, bulk	19.00
Glen Tay, Ontario, Can.—Color, flesh red to pink; analysis, K_2O, 12.81%; Fe_2O_3, .11%, etc., crude, bulk	7.00@ 7.50

Blended Feldspar
(Pulverized)

Tenn. Mills—Bulk	16.00@20.00
Toughkenamon, Pa.—Color, white to light cream; 98% thru 125-150 mesh, bags, 12.00@13.00; bulk	10.00

Chicken Grits

Toughkenamon, Pa.—(Feldspar) 100-lb. bags, 1.00; bulk, per ton	10.00
Danbury, Conn., Rockdale and West Stockbridge, Mass. — (Limestone) bulk	7.50@9.00*

*L.C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass	14.50
Brighton, N. Y.	*19.75
Dayton, Ohio	12.50@13.50
Detroit, Mich.	13.50@15.00
Farmington, Conn.	14.00
Flint, Mich.	16.00@19.00
Grand Rapids, Mich.	12.00
Hartford, Conn.	14.00
Jackson, Mich.	13.00
Lancaster, N. Y.	13.50
Madison, Wis.	12.00
Michigan City, Ind.	12.00
Milwaukee, Wis.	*13.00
New Brighton, Minn.	10.00
Pontiac, Mich.	13.77
Portage, Wis.	15.00
Rochester, N. Y. (del. on job)	19.75
Saginaw, Mich.	13.00
San Antonio, Texas	13.00@13.50
Sebewaing, Mich.	11.00
Syracuse, N. Y.	18.00
Terra Cotta, D. C.	13.50
Toronto, Canada	*15.60
Wilkinson, Fla.-White	12.00
Buff	16.00

*Delivered on job. †Delivered in city limits.

Portland Cement

Prices per bag and per bbl, without bags net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.		3.47
Atlanta, Ga.		2.35
Baltimore, Md.		2.35
Birmingham, Ala.		2.30
Boston, Mass.		2.63
Buffalo, N. Y.		2.38
Butte, Mont.	.90¼	3.61
Cedar Rapids, Iowa		2.34
Charleston, S. C.		2.35
Cheyenne, Wyo.	.82¾	3.31
Cincinnati, Ohio		2.37
Cleveland, Ohio		2.29
Chicago, Ill.		2.10
Columbus, Ohio		2.34
Dallas, Texas	.48¾	2.15
Davenport, Iowa		2.29
Dayton, Ohio		2.38
Denver, Colo.	.81¼	3.25
Detroit, Mich.		2.15
Duluth, Minn.		2.09
Houston, Texas		2.60
Indianapolis, Ind.		2.29
Jackson, Miss.		2.60
Jacksonville, Fla.		2.50
Jersey City, N. J.		2.33
Kansas City, Mo.		2.33
Los Angeles, Calif.	.63	2.52
Louisville, Ky.		2.27
Memphis, Tenn.	.65	2.80
Milwaukee, Wis.		2.25
Minneapolis, Minn.		2.32
Montreal, Que.		1.90
New Orleans, La.		2.40
New York, N. Y.		2.25
Norfolk, Va.		2.35
Oklahoma City, Okla.		2.56
Omaha, Neb.		2.51
Peoria, Ill.		2.27
Philadelphia, Penn.		2.41
Phoenix, Ariz.		3.70
Pittsburgh, Penn.		2.09
Portland, Colo.	.72½	2.90
Portland, Ore.		2.60
Reno, Nevada	.75¼	3.01
Richmond, Va.		2.47
Salt Lake City, Utah	.70¼	2.81
San Francisco, Calif.		2.31
Savannah, Ga.		2.50
St. Louis, Mo.	.57½	2.20
St. Paul, Minn.		2.32
Seattle, Wash.		2.65
Tampa, Fla.		2.60
Toledo, Ohio		2.20
Topeka, Kans.		2.40
Tulsa, Okla.		2.43
Wheeling, W. Va.		2.17
Winston-Salem, N. C.		2.79

NOTE—Add 40c per bbl. for bags.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.		1.95
Chattanooga, Tenn.		2.45*
Concrete, Wash.		2.35
Davenport, Calif.		2.05
Detroit, Mich.		2.15
Hannibal, Mo.		2.05
Hudson, N. Y.		2.05
Leeds, Ala.		1.95
Mildred, Kans.		2.35
Nazareth, Penn.		1.95
Northampton, Penn.		1.95
Steelton, Minn.		2.00
Toledo, Ohio		2.20
Universal, Penn.		1.95

*Including sacks at 10c each.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	—Plaster Board— ⅜x32x 36". Wt. 1500 lb. Per M Sq. Ft.	½x32x 36". Wt. 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48". Lgths. 6'-10', 1850 lb. Per M Sq. Ft.
Centerville, Iowa	3.00	3.50	15.00	8.00	9.00	9.50	9.50	.....	25.80	10.00	.....	.....	.....
Detroit, Mich.‡	.....	.....	.....	11.30	11.30	11.30	.....	8.00	.....	.....	.....	.....	.....
Douglas, Ariz.	.....	.....	7.00	.....	.....	15.50d	18.50	.....	30.00	15.50	.....	.....	.....
Grand Rapids, Mich.	3.00	6.00	10.00	9.00	9.00	9.00	19.50m	8.00	29.25*	20.00	19.38	20.00	30.00
Gypsum, Ohio‡	3.00	4.00	6.00	8.00	9.00	9.00	18.00	7.00	27.00	18.00	.....	20.00	30.00
Hanover, Mont.	.....	.....	.....	11.80	.....	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles, Calif.	.....	.....	.....	10.30k	.....	.....	.....	.....	.....	.....	.....	.....	.....
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	.....	.....	16.40	.....	17.40	.....	.....	.....	.....	.....	.....
Seattle, Wash.	9.00	.....	11.00	12.00	13.00	.....	.....	.....	.....	.....	.....	.....	.....
Sigurd, Utah	.....	.....	.....	.....	.....	.....	.....	.....	18.00a	.....	.....	.....	.....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00	25.00	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).
*To 3.00; †to 11.00; ‡to 12.00; ‡prices per net ton, sacks extra; (a) to 21.00; (b) net; (c) gross.
(d) hair fibre; (f) delivered; (h) delivered in 6 states; (i) delivered on job; (k) sacks 12c extra, rebated.
(m) includes paper bags; (o) includes jute sacks.

New Machinery and Equipment

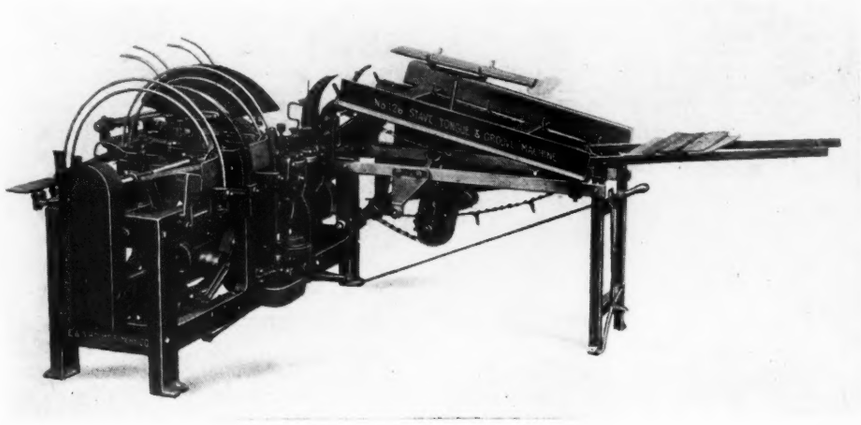
Tongue and Groove Machine With New, Automatic Stave-Packing Attachment

AN AUTOMATIC stave-packing attachment, recently designed and built by the E. & B. Holmes Machinery Co., of Buffalo, N. Y., has just been put on the market for operation on Holmes' tongue and groove machines. The attachment is used for placing the finished staves in uniform order and position on a projecting rack, and for piling the staves upright against each other in a nesting position. With the staves arranged in this manner, they are then ready for placement in the setting-up machine.

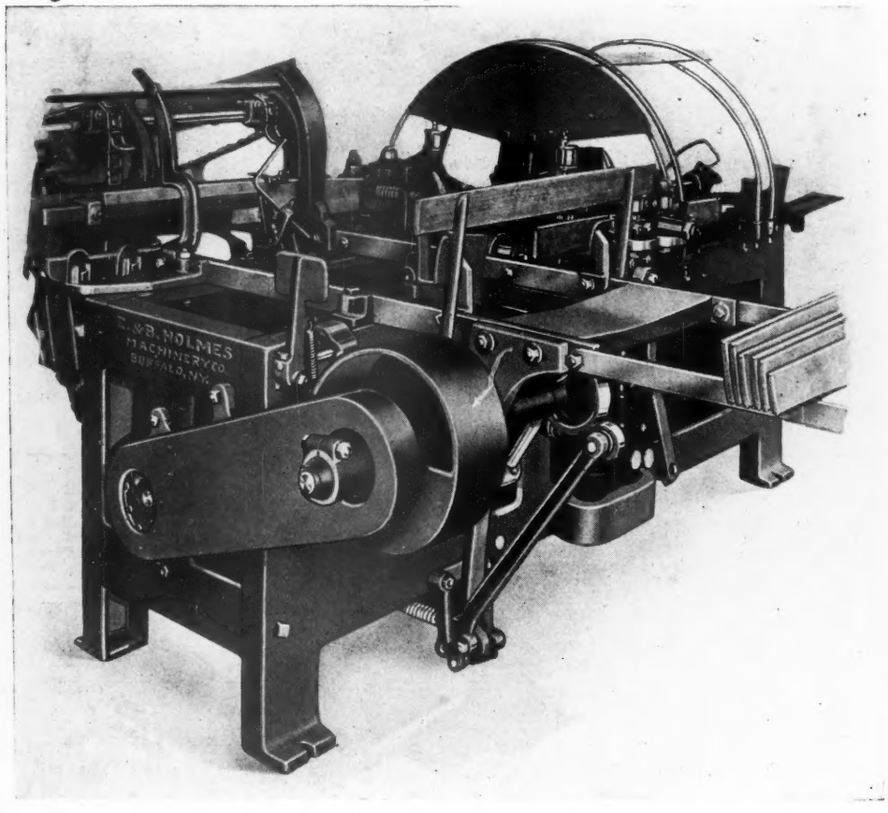
The construction items of this packing attachment are two upright, stave carrying arms, a driven shaft with a cam and crank attachment, two connecting rods, and an upright, pivoted guide-bar with a cross-head section to which the carrying arms are attached. A chain connects the driven shaft with the main drive shaft of the machine.

The operation of the packing attachment is as follows: The carrying arms move from the position shown in the illustration down to the plane of this horizontal rack. As the arms continue to pass down and beyond this plane, the stave is left upright on the rack. The now empty carrying arms, after reaching the end of their downward stroke, start on their return, upward elliptic motion to a position directly under the newly grooved and tongued stave in the receiving groove. The arms, as they pass upward and beyond the plane of these receiving grooves automatically receive the newly finished stave. This latter in return is now carried over and down onto the horizontal rack where it likewise is deposited. Thus this automatic packing action continues throughout the grooving and tonguing operation. At the end of the rack will be seen a group of finished staves piled in position, with the grooved edges of the staves face-up. As each new stave is deposited on the rack, it pushes the preceding staves ahead, until finally the entire rack is filled. They are then removed and placed on the floor in the same position, ready to be assembled and trussed.

With this attachment incorporated, the operation of grooving, tonguing and packing the staves may be said to be entirely automatic in character. Only one operator is required to keep the machine supplied with material. The distance between the two carrying arms is adjustable to suit the length of stave being grooved and tongued.



New tongue and groove machine



Close-up showing the stave packing arrangement

In addition to the automatic packing attachment, the tongue and groove machine is equipped with a feeding device which reverses every alternate stave, thereby making both ends of the assembled barrel of the same diameter. After placing the staves in the automatic feed runway, which operates on the principle of an endless chain, the staves are carried by a pair of feed rolls to the right and over the revolving grooving cutters. The staves are next carried automatically to the other side of the machine in a upright, semi-circular guideway, and to a position in front of a pair of tongue forming knives. The staves are again caught between a pair of feed rolls and they are now forced in the reverse direction over the tongue forming cutters. With the staves grooved and tongued, they are now automatically piled in position on the rack, as previously described.

This tongue and groove machine, with which the automatic packing attachment is used, is said to be able to work cross-grained staves without tearing-out or making rough edges. It can be driven either from direct

motor attached to the main drive shaft or by a belt running on tight and loose pulleys. The machine requires no countershaft and is entirely self-contained. The pulley on the cutterhead shaft is 4 in. in diam. by 4 in. face and makes 5,200 r.p.m.

Dimensions and capacity of this tongue and groove machine are:

Floor Space	6½ x 9 ft.
Cubic Contents	195 cu. ft.
Weight	3,000 lbs.
Horsepower	5
Capacity	15,000 to 20,000 staves

Lever Arm Sheave Arrangement for Clamshell Buckets

THE tendency in clamshell bucket design has been toward the elimination of moving parts, and the lever arm type has been highly developed because moving parts are reduced to a minimum and their motions are through small angles.

The manufacturers of Blaw-Knox buckets say that the vulnerable point in the lever arm type of bucket has always been the sheaves and bearings at the end of the lever arm. These parts must be fully protected against the entry of sand and other materials which destroy bearings and bushings. Frequent and thorough greasing is always necessary.

The lever arm arrangement shown here has increased the life of bearings and sheaves in clamshell buckets ten to twenty fold over the life of similar parts in lever arm clamshells using plain, short bushings, according to the makers, who describe it as follows:

"In operation, Sheave A turns at about one-half the speed of Sheave B, as it is the second sheave in a block-and-tackle reeving. Advantage is taken of this fact to reduce the bearing speeds one-half. The design, furthermore, doubles the bearing areas. Instead of turning the sheaves on a short fixed pin, as is the usual practice, the pin itself is revolved at one-half the speed of the closing line by keying it to Sheave A. Sheave B, with its extra long bearing (obtained by offsetting hub of Sheave A) turns, of course, at full line speed but it turns on a surface moving at one-half speed in the same direction. The bearing speed is, therefore, one-half arrived at by the difference between the full speed of Sheave B and the half speed of the pin.

"The large cup bushings prevent wobbling of the sheaves with resultant flange wear. Sand and other abrasive matter is excluded from bearings, the outside ends have no openings and oozing of the grease at the inside, as the pin moves slightly (like a piston in a cylinder) seals the bearings effectively.

"Wherever motion occurs a bushing is provided, and a high pressure 'Alemite' gun is used to force grease into the bearing. Fewer repairs are necessary and the upkeep cost of a clamshell bucket is materially reduced by this new arrangement of the lever arm sheaves."

The arrangement described is a feature of the Dreadnaught Bucket manufactured by the Blaw-Knox Company, of Pittsburgh, Penn.

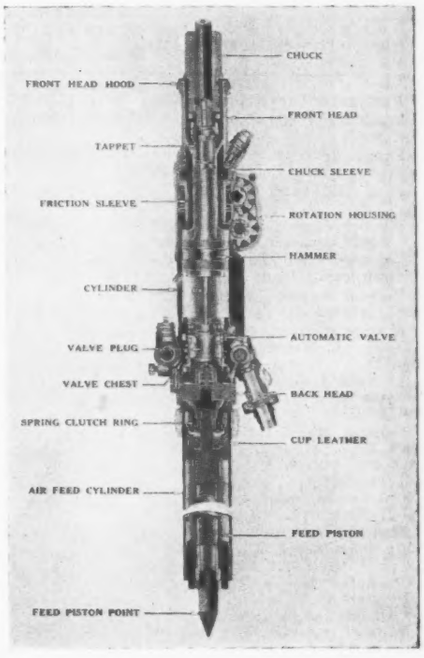
Dimensions and Loads for Roller Bearings

THE Hyatt Roller Bearing Co. have recently issued an excellent and comprehensive bulletin, which is of great value to plant operators and engineers in determining the correct size, type and load for roller bearings. It contains among other things, a formula for the derivation of the bearing capacity. This takes into consideration the different factors such as the effect of speed and shaft hardness. There are handy reference charts and tables on these factors and examples of their use to enable the engineer or operator to easily apply the given formula to his bearing problem.

The bulletin contains, in addition, many illustrations of the Hyatt roller bearing which also show the details of their construction. There are four tables of basic capacities and dimensions of these bearings which are based on the type of bearing to be used. The bulletin is called No. 1559 and punched for binding.

A New Stoper Drill

THE cut shows a section through the new Waugh Turbro Stoper, made by the Denver Rock Drill Manufacturing Co. This is the drill that has gained a great reputation in the Rocky Mountain states

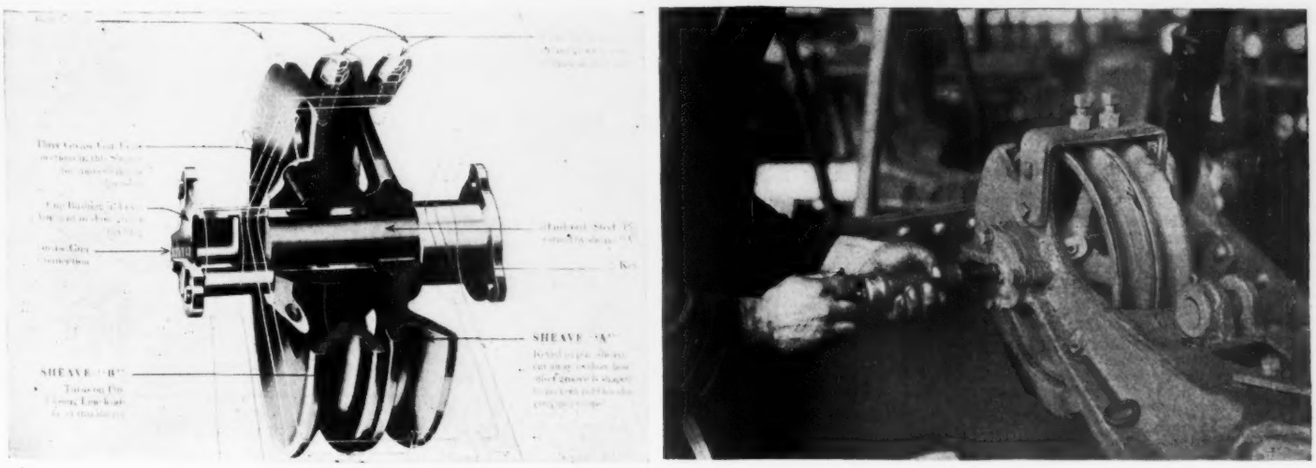


Sectional view of drill

because of its successful use in the great Moffatt tunnel in Colorado.

The advantages claimed by the makers are: that the rotation is independent, which eliminates the expense and annoyance of stuck steel; the rapid drilling speed increases the footage per shift; the rotation is mechanically correct and the friction clutch absorbs unusual stresses and minimizes breakages. The air feed may be had in either direct or reverse type.

They also say that no trouble is experienced in "collaring" and that it is especially good in fissured rock.



Left—Section through the sheave bearing. Right—Lubricating the main bearing

News of All the Industry

Incorporations

Freshwater Gravel Co., Seattle, Wash., $150,000.

Washington Quarries Co., Olympia, Wash., $1,000,000.

Sunnyside Granite Co., Richmond Va.; capital increased from $25,000 to $50,000.

Sand Hill Sand Co., Star, N. C., $50,000; T J. Ellis, J. H. Chisolm and others.

Hoosier Lime Co., Salem, Ind., increased capital stock from $30,000 to $100,000.

Superior Sand and Gravel Co., Superior, Neb., increase capital from $10,000 to $25,000.

Beaver Portland Cement Co., Portland, Ore., has increased its capital stock to $1,000,000.

Monroe Crushed Stone Co., Bloomington, Ind., $20,000; J. H. and Charles Matlock and Claude Rankin.

Lenawee Sand and Gravel Co., Tecumseh, Mich., has increased its capital stock from $125,000 to $175,000.

General Material Co., Wilmington, Del., $600,000; T. L. Croteau, Wilmington. To mine stone, rock and sand.

Industrial Sand and Gravel Corp., Norfolk, Va., $5000 to $50,000; J. M. Baker, C. N. Bailey and A. D. Overmyer, all of Norfolk.

Bertolini Traprock Co., Trumbull, Conn., $200,000; John Bertolini and others, all of Trumbull. To deal in sand, gravel and stone.

Roanoke Concrete Pipe Co., Roanoke, Va., has increased its capital from $50,000 to $100,000. G. D. Shiplett, Roanoke, is president.

United Concrete Products Co., Haines City, Fla., $100,000; Fred A. Kuhn, Cambridge, Mass.; J. G. Dalton, Haines City and others.

W. H. Pelkey, Inc., Fair Haven, Vt., $150,000; Esther Williams, J. C. Pelkey and W. E. Grace. To operate slate quarry, manufacture slate, etc.

Roberts-Williams Slate Mining Co., Albany, N. Y., $50,000; G. G. Roberts, G. G. Williams and J. H. Cunningham. (Attorney, G. B. Snyder, Albany.)

Portland Stone Manufacturing Co., Inc., Portland, Ore., $5000. To operate a stone quarry. By A. M. Mayer, J. B. Bouchard and Edward Calkins.

Atlas Gypsum Corp., New York, N. Y., 10,000 common, no par; B. M. Beckett, S. Hedden, L. R. Burch. (Attorneys, Cotton and Franklin, 43 Exchange place, New York.)

The Eastern Minerals Co., Boston, Mass., $95,000; 9500 shares $10 each. President, George B. Quinby; treasurer, Edward J. Scott, 8 Tremont street, Reading, and Charles W. Rogers.

Progressive Sand and Gravel Co., Fairlawn, N. Y., $125,000; H. T. and F. G. Backhus of Woodridge, N. Y., and F. E. Hartmann of Haledon. (Attorney, Herbert Wulding, Carlstadt, N. Y.)

Hunt-Drury Gravel Corp., Mineola, N. Y., 250 shares of $100 par and 2500 common, no par. R. T. Childs and W. S. Smith. (Attorney, I. D. Rogers, Mineola.) Manufacture cement blocks, etc.

Miami Crushed Rock Corp., Miami, Fla., $300,000;W. W. Sayles of Providence, R. I., G. G. Sayles, H. Finkle, and E. C. Moore. Twenty-five acres with quarry acquired. Will also build a cement block plant of 4000 blocks per day capacity.

Quarries

White River Marble Co., Magnolia, Ark., has opened a new quarry.

Belvidere Stone Co., Belvidere, Ill., has installed a new pump at their quarry.

National Quarries Co., Carey, Ohio, has completed plans for a new stone-crushing works at Spore, Ohio, to cost $150,000 with equipment.

Roberts Crushed Stone Co., Johnstown, Pa., has been forced to permanently abandon the opening of their quarry because of condemnation of a large portion of their operating space to make way for a new railroad.

Cummer Lumber Co., Jacksonville, Fla., has 90 acres under developmnet near Kendrick, Fla., and will install rock crushers, a steam shovel, oil engine, etc., to give the quarry a capacity of 40 cars of crushed lime rock per day.

Huntsville Stone and Crusher Co., Huntsville, Texas, W. F. Paul, manager, installed additional crusher, construction by owner; daily output 10 cars crushed stone; equipment furnished by Austin Manufacturing Co., Chicago, Ill.

Chemical Lime Co., Bellefonte, Pa., set off the third blast of the present season. Six tons of dynamite distributed over 17 holes were used to loosen from 75,000 to 100,000 tons of limestone. New orders for a winter's supply of furnace stone made this last blast necessary.

Consolidated Stone Co., Bedford, Ind., has acquired property in the Clear Creek section, Bloomington, Ind., and plans the construction of a new limestone quarry and mill to cost $75,000 with machinery. Traveling cranes and other handling and conveying machinery will be installed. A. E. Dickinson is president.

Sand and Gravel

Berkshire Gravel Co., Lenoxdale, Mass., met with a loss of $20,000 through destruction of plant buildings and machinery by a recent fire.

Cross County Gravel Co., Cherry Valley, Ark., has shortened its output from eight cars per day to six, due to decreased demand during the exceedingly wet weather recently.

Industrial Sand and Gravel Co., Norfolk, Va., will develop sand pits in that city. Daily output of sand will be about 15 cars. A. D. Overmeyer, 1309 Magnolia avenue, Norfolk, is vice-president.

Wabee Gravel Co., Milford, Ind., is reported to close its plant for the season within a short time. The company had a good year, having furnished over 1500 cars of gravel to the Big Four railroad, besides hundreds of other cars to individual concerns.

Vernon B. Hammatt has purchased the Cressey gravel bar, on the Merced river, near Cressey, Calif., and is installing a modern sand and gravel plant. Bunkers of 200-yd. capacity are now being built, and all machinery installed will be electrically operated.

Cement

Hercules Portland Cement Corp., Philadelphia, Pa., will soon award the contract for the erection of a two-story 65x120-ft. packhouse at their Hercules, Pa., plant.

Sun Portland Cement Co., Portland, Ore., is planning the building of new storage pits and sheds for clay, and the addition of handling and conveying machinery to their Lime, Ore., plant.

Atlas Portland Cement Co., Leeds, Ala., has work in progress on a new unit at its local mill, to include the installation of a kiln, conveying and handling equipment, etc., to cost $200,00 with machinery.

Louisville Cement Co., Louisville, Ky., has awarded contract for the excavation and construction of their new plant, to be built near Akron, N. Y., to the J. W. Comper Co. of Buffalo, N. Y. (See November 14 issue, p. 75, for details.)

Cumberland Contracting Co., Cumberland, Md., is reported to have taken over porperty of the Cumberland Hydraulic Cement and Manufacturing Co. at Wills Creek. They will probably erect warehouses, storage yards and rebuild trestle.

Cement Products

C. M. Smith, formerly of Asheville, N. C., plans erecting plant to manufacture hollow concrete tile at Sanford, Fla.

J. B. Cox and Son, West Austontown, Ohio, are erecting a plant at that place for the manufacture of concrete block, etc.

A. W. Frank, Philadelphia, Pa., has acquired the Kaplan Cement Block Co., Ojus, Fla. Operation will be continued and capacity will be increased.

Leo Burger and Son, San Antonio, Fla., have acquired a site on which they intend to erect a plant for the manufacture of cement block and other building material.

Thomas Reeves and Son, Burlington, Vt., are planning to build a new department to their cement block plant on the Winooski road. It is expected that cement brick will be made in this new addition.

United Concrete Products Co., Haines City, Fla. (incorporation reported November 28 issue), has acquired the two plants of the Cement Products Co. at Winter Haven, Fla., including real estate and equipment. F. A. Kuhn, Cambridge, Mass., and J. G. Dalton, Haines City, are among the members of the company.

Lime

Superior Lime and Hydrate Co., Inc., of Pelham, Ala., H. G. Bridgewater, president, is building two additional kilns, increasing capacity 50%.

Sand-Lime Brick

Silica Brick Co., Albany, Ga., furnished the sand-lime brick used in the construction of the new six-story hotel, built at Albany recently.

Silica Sand

John W. Nance and Irwin Juhre have formed a company to develop silica deposits at Rogers, Ark.

Magnesite

Krystal Rok Stucco Co. plant at Lake Alfred, Fla., is nearly completed. Production of magnesite stucco, flooring, etc., has been carried on for the past three months and the output will be increased after completion of the plant.

Rock Asphalt

United States Rock Asphalt Co., Leitchfield, Ky., acquired the Continental Rock Asphalt Co., Bigclifty, Ky. Plant will be enlarged and operated.

Potash

Soda Potash Products Co., Riverside, Calif., has awarded a general contract to the Union Engineering Co., Los Angeles, for a new plant consisting of 10 one-story units, each 100x200 ft., to cost $900,000 with equipment.

Personals

B. R. Bates, of the Dorr Co. of New York, returned to New York recently from South Africa, where he has been for the past few months on business connected with the company's interests in that country.

Victor C. Alderson, Sc.D., former president of the Colorado School of Mines, has opened offices in the Symes Bldg., Denver, Colo., and will devote his attention to the development of the oil shale industry.

James Reed was appointed works manager in charge of plant operations of the Celite Co.'s plants at Lompoe and White Hills, Calif. Mr. Reed is a graduate of U. S. Naval Academy, class of 1902, and a post-graduate of the Massachusetts Institute of Technology. From the time of graduation until 1920, he was connected with the U. S. Navy Department in the Bureau of Construction and Repairs, specializing in shop management and labor problems. He resigned from this to become assistant to the president of the Los Angeles Ship Building Co. Commencing with 1922, Mr. Reed has engaged in private practice as a consulting and supervising engineer.

Obituary

Wellington Barnes, at one time connected with the Dixie Portland Cement Co., died recently at Chattanooga, Tenn.

Trade Literature

NOTICE—Any publications mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Hand Cranes. Bulletin No. 19 illustrating and describing 1 to 5-ton capacity hand cranes equipped with hand or electric hoist and travel. Details of construction, dimensions, etc. HARNISCHFEGER CORP., Milwaukee, Wis.

Roller Bearings. Illustrated bulletin featuring roller bearings for mill and crane type motors. Diagrammatic views of machinery equipped with these bearings. 4 pp., 8½x11 in. HYATT ROLLER BEARING CO., Newark, N. J.

Power Shovels. Bulletin No. 2514 featuring new heavy duty gas shovel. Description and illustrations of mechanism and operation in the industry. Features easy control and continuous tread mounting and adaptability to crane or dragline operation. 12 pp., 8½x11 in. OSGOOD CO., Marion, Ohio.

Industrial Paints. Bulletin 103 featuring waterproof, damp-proof, resistive paints for metal and wood surfaces. Illustrations, description of products, etc. Details of application and color cards. 23 pp., 8½x11 in. GOHEEN CORP., Newark, N. J.

Steam Turbines. Bulletin G.E.A.-235, describing and illustrating General Electric 5-stage, 60-cycle, 3600-r.p.m. steam turbines, rated at 500, 600 and 700 k.w. The general principles and advantages of steam turbines are discussed and sections and steam path diagrams shown. 16 pp., 8x10½ in. GENERAL ELECTRIC CO., Schenectady, N. Y.

Comparison of Diesel Engine Principles. Bulletin No. 1020; an analysis of the various factors which influence the design of Diesel engines. These factors are then interpreted in terms of what they mean to the Diesel engine user in over-all operating economy, simplicity in operation, low upkeep expense, long life, and dependability. Features 2-cycle principle and lists the advantages in mechanical and operating simplicity from this type. All points are illustrated and described.

Another phase of the Diesel engine design which is covered is the subject of airless and air injection of the fuel. The two-stage scheme of combustion which is used is also discussed. The factors which influence the horsepower rating of a Diesel engine are covered in a chapter on "Dissipation of Heat." 32 pp., 8½x11 in. FAIRBANKS, MORSE AND CO., Chicago, Ill.

Power Shovels. Bulletin No. 39 describing gasoline, steam and electric shovels of ½, ¾ and 1-yd. capacity. Illustrations, specifications and working dimensions of all types made. Features mounting of all types on special Orton flexible tread. Data on convertibility to cranes, draglines, etc., and regular equipment of booms and buckets that are standard for types V, T and E. 16 pp., 8½x11 in. ORTON AND STEINBRENNER CO., Chicago, Ill.

Manufacturers

Smith Engineering Works are now located at their new plant at 78 Lake boulevard, Milwaukee, Wis.

Gilman Manufacturing Co., East Boston, Mass., have made Hubbard-Floyd Co., 452 Lexington avenue, New York, their agents in the metropolitan district.

Dorr Co., Engineers, 247 Park avenue, New York, has announced the appointment of E. L. Bateman, The Corner House, Johannesburg, as sole agent for their equipment in South Africa.

Engineering and Sales Co., 24 California street, San Francisco, Calif., has been appointed Western representative for the Racine Radiator Co., Racine, Wis. This company will handle only the industrial line of Perfex radiators.

F. L. Smidth & Co., New York, have been awarded the contract by the Olympic Portland Cement Co., Seattle, Wash., for the engineering work and equipment necessary for increasing the capacity of their plant. (See November 14 issue, p. 87, for details of proposed expansion.)

Climax Engineering Co., Clinton, Iowa, announces the appointment of T. L. Keeling as sales representative for Climax Trustworthy engines in Ohio, western New York and western Pennsylvania. Mr. Keeling has been connected with the company for the past five years.

Colorado Iron Works Co., Denver, Colo., has secured the Western agency for Pettibone-Mulliken Co.'s manganese steel castings. Inquiries and orders for manganese steel castings may be addressed to the Denver office, the branch office at 315 Felt building, Salt Lake City, Utah, or direct to Pettibone-Mulliken Co., Chicago.

Allis-Chalmers Mfg. Co. is opening a branch sales office at Houston, Texas, in charge of R. I. Moore, who was previously located in their Dallas office. Temporary quarters are at 231 Rodgers Bldg. and after the first of the year the office will be located permanently at 1108 Post Dispatch Bldg. The Houston office will be operated as a branch of the Dallas district, of which E. W. Burbank is district manager.

Florida Is Raiding the New York Market for Building Materials

SOME of the largest New York builders have giant jobs in Florida, and knowing the intricacies of building material trading in this market, have an advantage over the paid agents sent up here from Florida to buy basic building materials and get them there at any price so that construction may not be delayed, says the November 24 issue of the *Dow Service Building Reports.*

One of the largest cement manufacturers in North America is diverting a large part of his Montreal plant capacity to Miami via New York City. Even Hudson River common brick has been shipped to Florida and in the last ten days there has been only one shipload of foreign common brick come into New York. It is believed that foreign brick is now being sent direct to Florida. Plaster block is going to Florida as fast as boats are available to take it. This is true of nearly all the so-called "starting" materials.

Meantime plans and preparations for New York to proceed with construction at its present head-long pace are unabated. There is at the same time developing a big fuel shortage. A warm climate construction movement is taking all the building material it can get at almost any price while this city in its cold, and normally dull season, is laying plans to use more building materials next year than it has ever consumed before.

It is proper to ask, under such circumstances, where this supply, already below normal in October, is to come from next spring—and at what price? Prices are even now beginning to move up at a time when they usually move down.

When well rated builders abandon this market and spring up in Florida their places are filled by other reputable contractors, but all down the line, the moving-up process takes place until at, and for quite a way up from the bottom now, the untrained, unrated, unqualified and unequipped builder, fattened, however, with illgotten wealth by housing speculation in Bronx, Brooklyn and Queens of the type condemned by fire department officials, insurance men and welfare workers in general—the kind of owner-builder to whom price is all and quality is nil—also moves into the picture. It is this type of builder with whom established sub-contractors and building material supply men cannot do business except on the basis of losing both sou and soul that constitutes a real danger to banks and to thrifty investors. There is, besides, a physical menace to the public that only experienced builders are in a position to know.

The sub-contractors realize that it ought to be exposed. The banks and investors may or may not know how it affects them, but it is significant that the largest lender on building enterprises in the country foresees that it is leading back to the conditions of 1912 and have taken steps to stop further loans that can in any way encourage such practices any longer.

The building construction industry is arousing itself. Association after association is rising to the defense of their respective trades, and the announcement of the date and place of the December mass meeting called by the Dow service is being deferred merely to determine the size of the hall to hold it in.

Analyses of Pennsylvania Bituminous Coal

THE Pennsylvania Topographic and Geological Survey has recently issued Part IV of Bulletin M 6 which contains many analyses of the bituminous coal abounding in the state, along with interesting descriptions of the mines from which the samples were taken.

Samples to be analyzed were taken by the U. S. Bureau of Mines, the U. S. Geological Survey, and the Pennsylvania Geological Survey. All analytical work was carried out by the U. S. Bureau of Mines. The total number of samples taken was 755, representing 271 mines. These were selected from geographic areas not previously tested and, while they are many, do not entirely cover all the mines or beds in the state that have workable coal.

From time to time the Bureau of Mines has published the analytical results in large bulletins. Although the analyses in any one bulletin are grouped together by states, or by special uses, to look up the analyses of coals from any particular section of the country necessitates the perusal of a number of bulletins, some of which are no longer available for free distribution.

Moreover, when the bureau receives an inquiry for analyses of coal from any desired part of the country, it constitutes a large wastage of printed documents to send a number of bulletins in order to show the analyses for only one mining district in a state, or even for an individual mine. It therefore is deemed expedient to republish the analyses of coal in a series of inexpensive publications, by separate states.

This bulletin will be of considerable value to cement manufacturers, operators of lime kilns, gypsum products manufacturers, and many other rock products producers who use large quantities of coal. It will enable them to check accurately their own analyses and can be used as a basis for future purchase calculated to give them the best returns. Free copies are available on application to the Pennsylvania Topographic and Geologic Survey, Harrisburg, Penn.